PGB-5120S

Gaming Board

User's Manual

Version 1.1

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Appendix A

Appendix B

How to Use This Manual

The manual describes how to configure your PGB-5120S system to meet various operating requirements. It is divided into five chapters, with each chapter addressing a basic concept and operation of Single Host Board.

Chapter 1 : System Overview. Presents what you have in the box and give you an overview of the product specifications and basic system architecture for this series model of single host board.

Chapter 2 : Hardware Configuration. Shows the definitions and locations of Jumpers and Connectors that you can easily configure your system.

Chapter 3 : System Installation. Describes how to properly mount the CPU, main memory and Compact Flash to get a safe installation and provides a programming guide of Watch Dog Timer function.

Chapter 4 : BIOS Setup Information. Specifies the meaning of each setup parameters, how to get advanced BIOS performance and update new BIOS. In addition, POST checkpoint list will give users some guidelines of trouble-shooting.

Chapter 5 : Troubleshooting. Provides various useful tips to quickly get PGB-5120S running with success. As basic hardware installation has been addressed in Chapter 3, this chapter will basically focus on system integration issues, in terms of backplane setup, BIOS setting, and OS diagnostics.

The content of this manual is subject to change without prior notice. These changes will be incorporated in new editions of the document. **Portwell** may make supplement or change in the products described in this document at any time.

Updates to this manual, technical clarification, and answers to frequently asked questions will be shown on the following web site : http://www.portwell.com.tw/.

Chapter 1
System Overview

1.1 Introduction

PGB-5120S is an industrial All-in-one Game PCB compliant with world famous GLI & BMM regulation. Combine with either the Intel® SandyBridge/IvyBridge processor, PGB-5120S provides powerful performance.

It supports extraordinary features such as, "Non-Volatile RAM", "Triple Data Redundancy"," Secured RTC", "Watchdog Timer" , "Over Temperature Warning" and "SAS".

Slot Accounting System (SAS) is a slot accounting protocol for gaming machines such as video slots. It was initialized by IGT and became the de-facto casino communications standard. The latest version of the protocol is SAS 6.02 and it supports meter reporting, event logging, player tracking, bonusing, ticketing and cashless gamine.

Portwell provide SAS API to help customer handle SAS Protocol low level behavior. Our API features in

- Hardware 9-bit (wakeup) supported
- High performance logic engine to ensure data transmission can meet 20ms response time and 5ms Inter-Byte delay time.
- Synchronization between Host and Gaming Machine
- Acknowledgement for both general and long polls
- CCITT based Cyclical Redundancy Check
- Error Condition Handling, for example Gaming machine busy response, Loop break indication, and etc.

All these features make PGB-5120S a value-oriented solution for Slots and Multi-players application.

PGB-5120S series features:

- Compliant with GLI/BMM
- 5+2 Years lifespan
- Dual independent display by VGA/DVI
- Ultra fast 32bit, 66MHz PCI-Express operated SRAM
- Full duplex RS-485 and ccTalk
- SAS 6.02 compliant

1.2 Check List

PGB-5120S series package should contain the following basic items:

- One PGB-5120S All-in-one Game PCB
- SATA power cable
- SATA signal cable

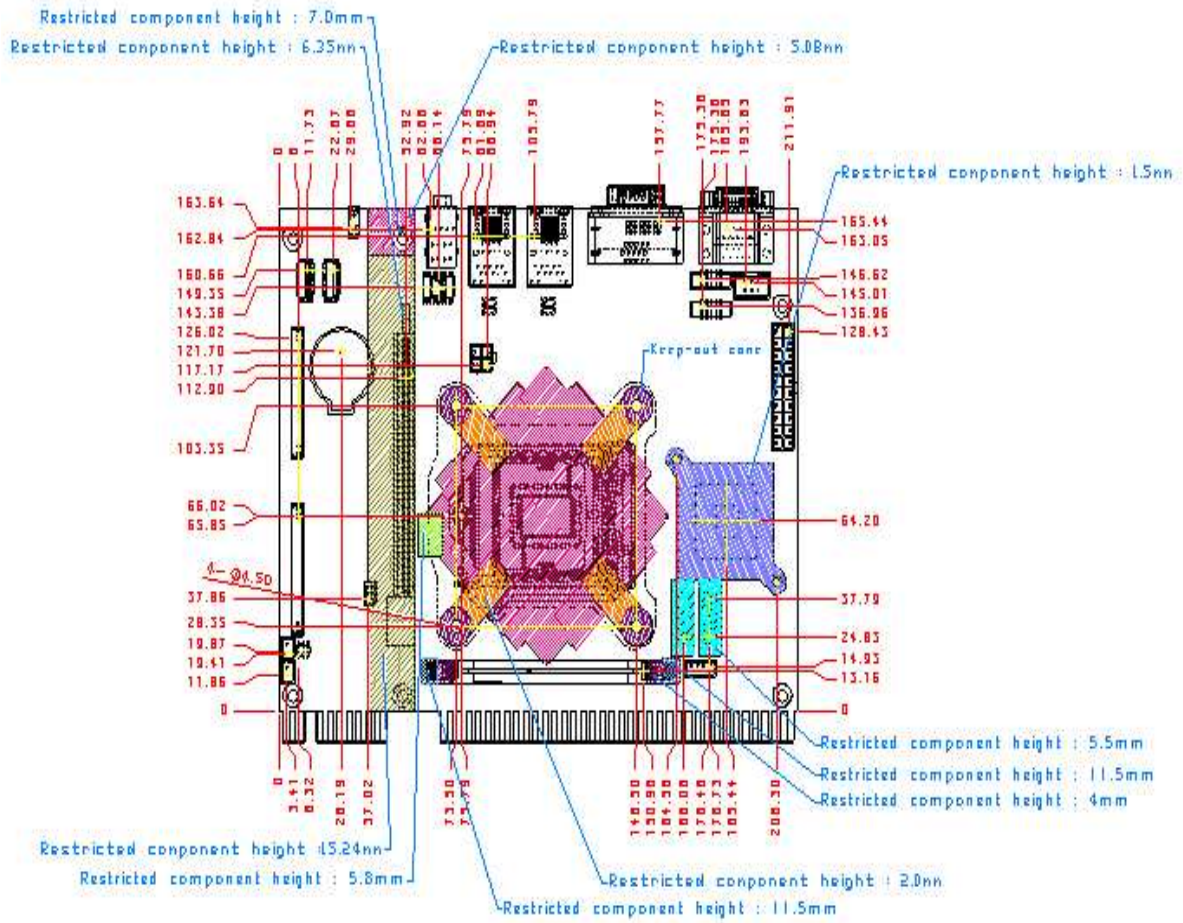
If any of these items is damaged or missing, please contact your vendor and keep all packing materials for future replacement and maintenance.

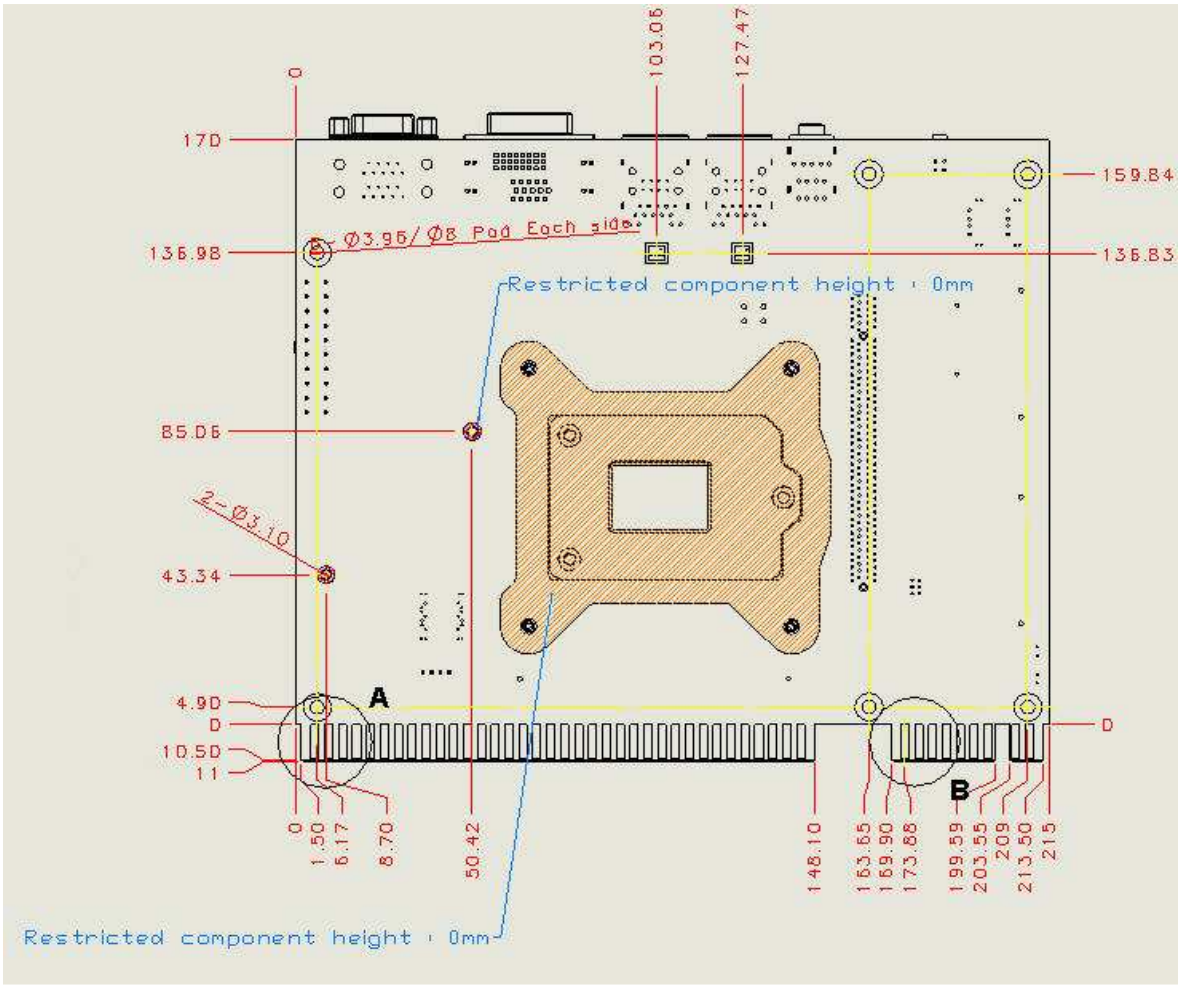
1.3 Product Specification

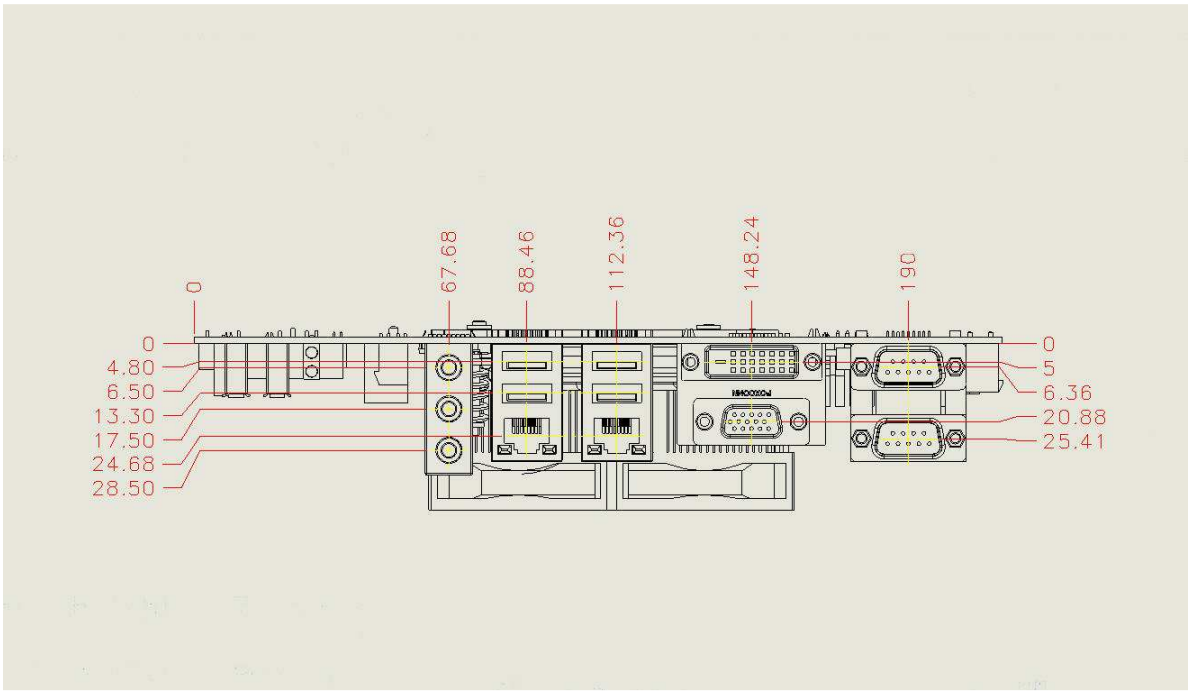
General	
Processor	Intel® SandyBridge/IvyBridge Processor
Chipset	Intel® H61 PCH
Memory	Single channel up to 4GB DDR3 1333/1066 on one
Storage Devices	2x SATA 3.0 Gb/s
Expansion	1x PCIe x16 slot
I/O Interface	
Audio	●High Definition Audio 5.1 channels output via Audio Jack ●Onboard Stereo 6W +6W Class A-B Amplifiers via 72-pin golden finger
Ethernet	Dual Gigabit Ethernet
Serial Port	2x RS232 port on rear I/O 2x RS232 port onboard pin header 1x SAS port onboard pin header 1x 4-wire RS485 port onboard pin header 1x ccTalk onboard pin header
USB	4x USB 2.0 on rear I/O 2x USB 2.0 onboard pin headers 2x USB 2.0 onboard vertical connector
Graphic	
Graphic	Intel® HD Graphics integrated GPU
Graphic Acceleration	2D: Directdraw, UXA/SNA and XRandR 3D: DirectX 10.1, OpenGL 3.0
Video Playback	H.264, MPEG-2, VC-1 hardware codecs DXVA, VA API media acceleration
Display Interface	VGA: up to 2048x1536 (QXGA) DVI: up to 1920x1200 (WUXGA)
Gaming Function	

Door Sensor Detection	8 door inputs - 6 at golden finger - 2 at onboard connector Operates with and without AC power Logs of Date/Time stamped of 44 events Battery voltage monitoring & warning Programmable de-bounce time
SAS 6.02	1 x SAS Port Hardware 9-bits data supported 20ms Response Time and 5ms Delay Time Synchronization and Acknowledgement Cyclical Redundancy Check Error Condition Handling
NVRAM	●Ultra fast 32bit, 66MHz PCI-Express operation ●1MBytes of battery backuped SRAM ●Dual independent physical banks and Dual battery backup design to ensure integrity ●4.5 Years Battery life without AC power ●Battery voltage monitoring & warning
Digital Input	●18 x Photo-coupler Protected Input ●Individual interrupt, triggered by rising/falling edges or level changed ●Programmable de-bounce supported
Digital Output	16 x open drain (150mA ~ 500mA); 50V 2 x 3A open drain
Mechanical& Environment	
Dimension	170mm(L) x 215mm(W)
Power Requirement	●Typical: +12V, +5V, (+3.3V) ●Support ATX mode from 20pin input or AT mode from 20pin Golden Finger
Environment	●Operation Temperature: 0~60 °C ●Storage Temperature: -20~85 °C ●Relative Humidity: 10~85%, non-condensing

1.3.1 Mechanical Drawing

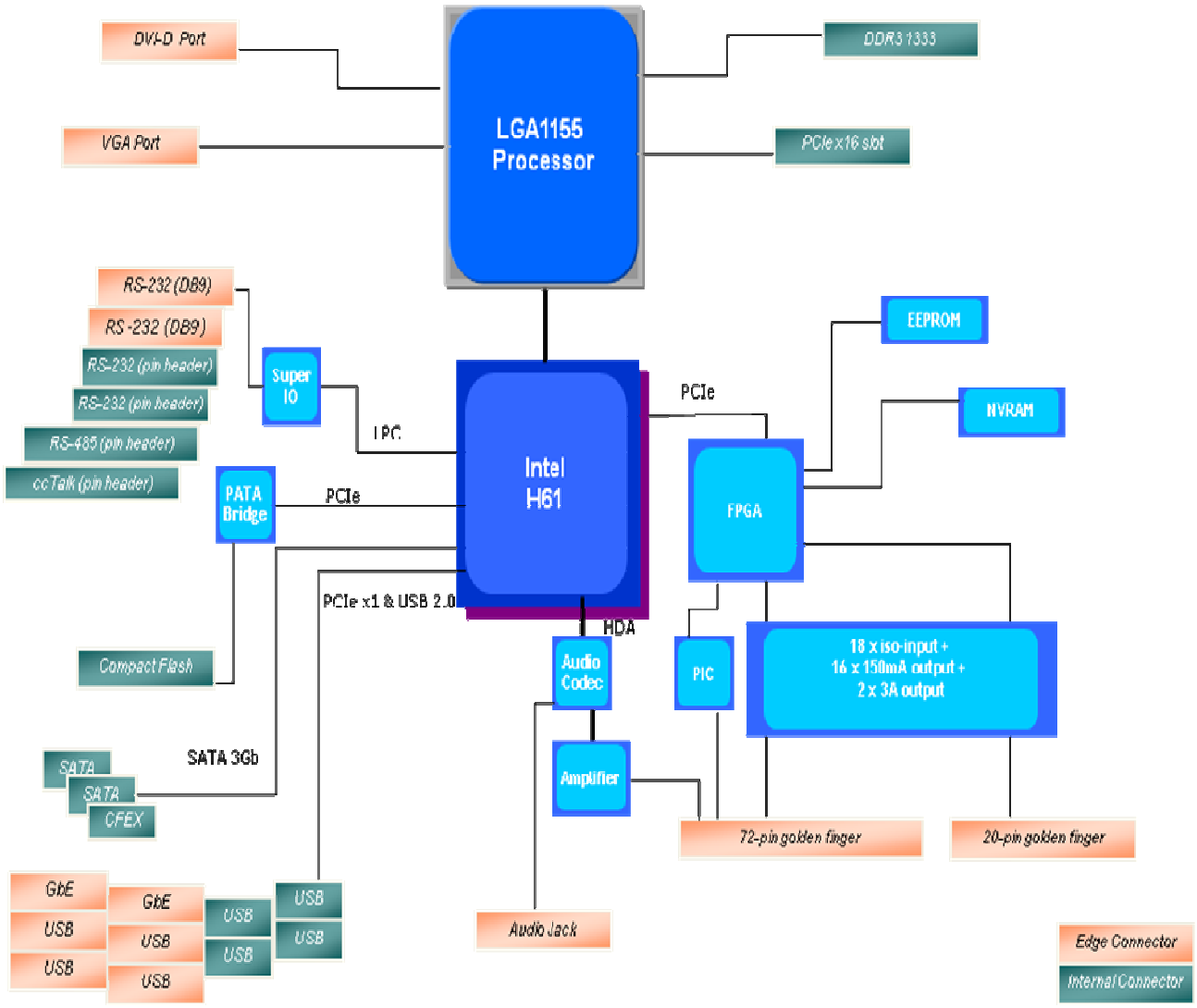

Restricted component height : 7.0mm
Restricted component height : 6.35mm
Restricted component height : 5.08mm
Restricted component height : 1.5mm
Keep-out zone
Restricted component height : 5.5mm
Restricted component height : 11.5mm
Restricted component height : 4mm
Restricted component height : 15.24mm
Restricted component height : 5.8mm
Restricted component height : 2.0mm
Restricted component height : 11.5mm


103.06
127.47
0
17.0
159.84
135.98
Ø3.95/Ø8 Pad Each side
135.83
Restricted component height : 0mm
85.06
2-Ø3.10
43.34
4.90
D
10.50
11
A
B
D
0
1.50
6.17
8.70
50.42
148.10
163.65
169.90
173.88
199.59
203.55
209
213.50
215
Restricted component height : 0mm


0
67.68
88.46
112.36
148.24
190
0
4.80
6.50
13.30
17.50
24.68
28.50
0
5
6.36
20.88
25.41

1.4 System Architecture

All of details operating relations are shown in PGB-5120S System Block Diagram.



PGB-5120S System Block Diagram

Chapter 2
Hardware Configuration

This chapter indicates jumpers', headers' and connectors' locations. Users may find useful information related to hardware settings in this chapter.

2.1 Jumper Setting

For user to customize PGB-5120S features. In the following sections, **Short** means covering a jumper cap over jumper pins; **Open** or **N/C** (Not Connected) means removing a jumper cap from jumper pins. Users can refer to Figure 1 and Figure 2 for the Jumper allocations.

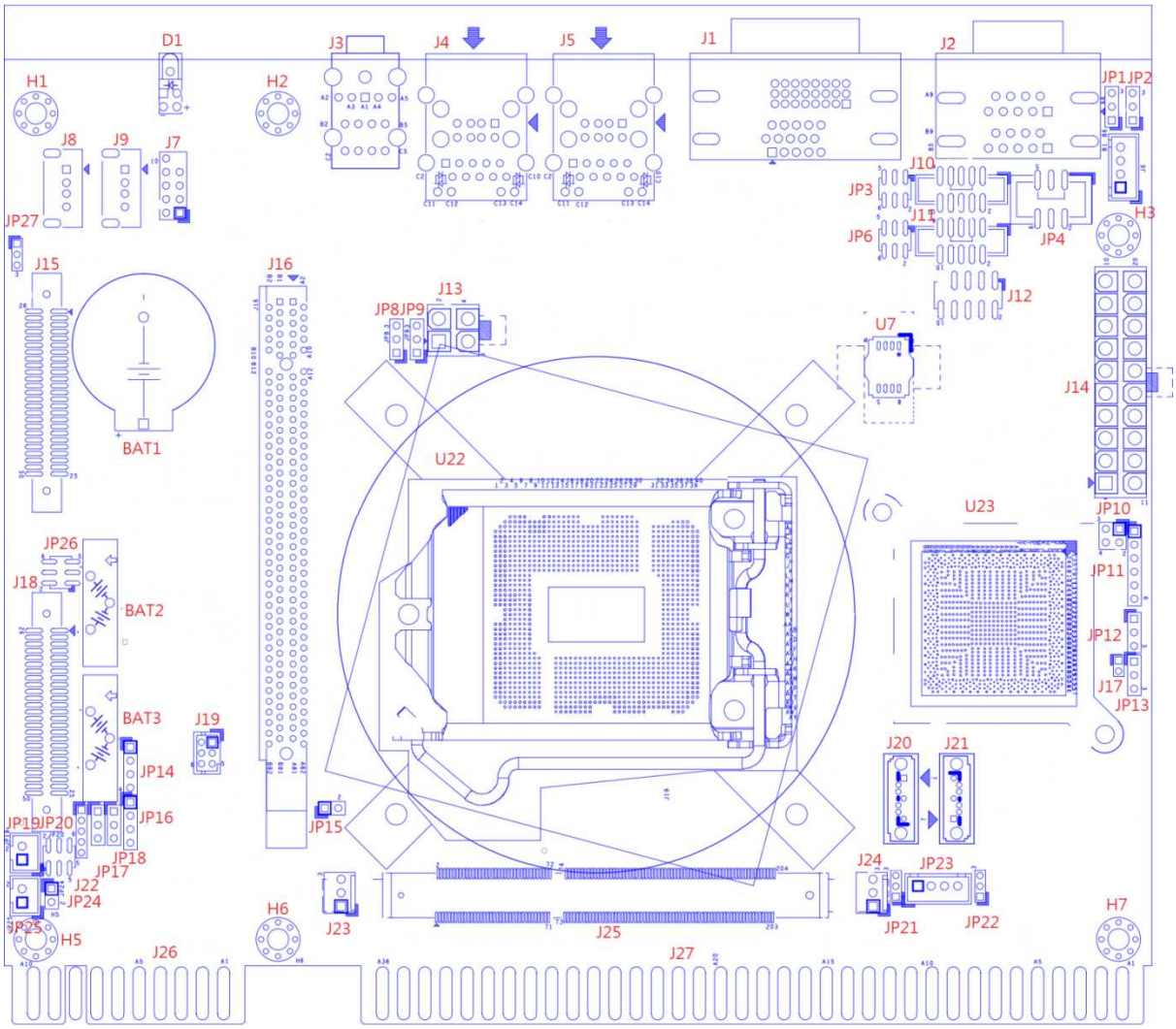


Figure1. PGB-5120S Top View

2.2 Connector Allocation

I/O peripheral devices are connected to the interface connectors

Connector Function List

Connector	Function
JP1	COM6 J6_Pin1 CCTALK_V+ Voltage Jumper Setting
JP2	COM6 J6_Pin4 CCTALK Pull High Voltage Jumper Setting
JP3	COM3 RI# Voltage Setting
JP6	COM4 RI# Voltage Setting
JP8	Programming port for PWM Controller
JP9	Debug Port for PWM Controller
JP10	Auto Power On Source Setting
JP11	Programming Port for MCU
JP12	Configure / Recovery Setting
JP13	Protected RTC Setting
JP15	VCCSA Voltage Selection
JP17	CMOS Clear Header
JP18	FPGA VCCO Power Setting
JP19	Internal Case Open 6 Setting
JP21	SATA1 / SATA DOM1 Setting
JP22	SATA0 / SATA DOM0 Setting
JP24	3.3V_FPGA Setting
JP25	Internal Case Open 7 Setting
JP27	BIOS Protect
JP28	Power function select
J30	GPI PULL HI 3.3V & 5V & +12V

Pin Assignments of Connectors

JP1: LVDS Backlight VDD Setting

JP1	Function
Short 1-2	+12V *
Short 2-3	VCC

Note : The " * " mark for default setting

JP2: COM6 J6_Pin4 CCTALK Pull High Voltage Jumper Setting

JP2	Function
Short 1-2	+12V *
Short 3-4	VCC

Note : The " * " mark for default setting

JP3: COM3 RI# Voltage Setting

JP3	Function
Short 1-2	VCC
Short 3-4	+12V
Short 5-6	RI#_3 *

Note : The " * " mark for default setting

JP6: COM4 RI# Voltage Setting

JP6	Function
Short 1-2	VCC
Short 3-4	+12V
Short 5-6	RI#_4 *

Note : The " * " mark for default setting

JP8: Programming port for PWM Controller

JP8	Function
Short 1-2	VCC

JP9: Debug port for PWM Controlleoller

JP9	Function
Short 1-2-3	Debug Port for PWM Controller

JP10: Auto Power On Source Setting

JP10	Function
Short 1-2	Normal Operation *
Short 3-4	Normal Operation *
Open 1-2	While Programming PIC
Open 3-4	While Programming PIC

Note : The " * " mark for default setting

JP11: Programming Port for MCU

JP11	Function
Short 1-2-3-4-5-6	Programming Port for MCU

JP12: Configure / Recovery Setting

JP12	Function
Short 1-2	Normal *
Short 2-3	Configure
Open	Recovery

Note : The " * " mark for default setting

JP13: Protected RTC Setting

JP13	Function
Short 1-2	Normal *
Short 2-3	CLR RTC

Note : The " * " mark for default setting

JP15: VCCSA Voltage Selection

JP15	Function
Open 1-2	0.925V *
Short 1-2	0.85V (for future processor compatibility)

Note : The " * " mark for default setting

JP17: CMOS Clear Header

JP17	Function
Short 1-2	Normal Operation *
Short 2-3	Clear CMOS Contents

Note : The " * " mark for default setting

JP18: FPGA VCCO Power Setting

JP18	Function
Short 1-2	VCC3 *
Short 2-3	3.3V_FPGA Floating to ground

Note : The " * " mark for default setting

JP19: Internal Case Open 6 Setting

JP19	Function
Short 1-2	Intrusion6
Open 1-2	Normally Mode *

Note : The " * " mark for default setting

JP21: SATA1 / SATA DOM1 Setting

JP21	Function
Short 1-2	SATA DOM
Short 2-3	SATA *

Note : The " * " mark for default setting

JP22: SATA0 / SATA DOM0 Setting

JP22	Function
Short 1-2	SATA DOM
Short 2-3	SATA *

Note : The " * " mark for default setting

JP24: 3.3V_FPGA Setting

JP24	Function
Short 1-2	FPGA External Power Link to GND
Open 1-2	Normal *

Note : The " * " mark for default setting

JP25: Internal Case Open 7 Setting

JP25	Function
Short 1-2	Intrusion7
Open 1-2	Normally Mode *

JP27: BIOS Protec

JP27	Function
Short 1-2	BIOS Protect
Short 2-3	BIOS Write

JP28: Power function select

(Because auto select in normal mode,don't use JP28 in normal mode)

JP28	Function
Short 1-2 & 3-4	Power in by Gold finger
Disconnect 1-2 & 3-4	ATX power

J30: GPI PULL HI 3.3V & 5V & +12V

J30	Function
Short 2-4	GPI PULL HI 3.3V
Short 3-4	GPI PULL HI 5V
Short 4-6	GPI PULL HI +12V

Connector Table

Connector	Function Descriptions
J1	VGA + DVI-D Connector
J2	COM1, COM2 Connector
J3	Audio Jack Connector
J4	RJ45 + USB x 2 Connector
J5	RJ45 + USB x 2 Connector
J6	COM6 CCTalk Connector
J7	USB x 2 Header
J8	USB Connector
J9	USB Connector
J10	COM4 RS-232 Connector
J11	COM3 RS-232 Connector
J12	LPC Debug Port Header
J13	ATX 4P Connector
J14	ATX 20P Connector
J15	CFEX Connector
J16	PCI-E x 16 Connector
J17	System Reset Header
J18	CF / CF-SATA Connector
J19	SAS COM PORT Pin Header
J20	SATA / SATA DOM Connector
J21	SATA / SATA DOM Connector
J22	PIC Program Header
J23	SYSFANOUT Header
J24	CPUFANOUT Header
J25	DIMM Connector
J26	Power in Golden Finger 10P x 2
J27	Golden Finger 36P x 2
D1	Power and HDD LED
JP4	COM5 4-wire RS-485 Header
JP14	JTAG Programming Header
JP16	JTAG Programming Header
JP20	FPGA 3PX2 GPIO Header
JP23	SATA Power Header

J1:VGA + DVI-D Connector

Pin	Assignment	Pin	Assignment
A1	DVI_D_RD2N	A2	DVI_D_RD2P
A3	Video GND	A4	NC
A5	NC	A6	DVI_CON_CLK0
A7	DVI_CON_DAT0	A8	NC
A9	DVI_D_GD1N	A10	DVI_D_GD1P
A11	Video GND	A12	NC
A13	NC	A14	DVI_CON_5V
A15	Video GND	A16	DVID_SHF_HPD
A17	DVI_D_BD0N	A18	DVI_D_BD0P
A19	Video GND	A20	NC
A21	NC	A22	Video GND
A23	DVI_D_CLKP	A24	DVI_D_CLKN
B1	VGA_RED	B2	VGA_GREEN
B3	VGA_BLUE	B4	NC
B5	Video GND	B6	VGADCT
B7	VGA_VAGND	B8	VGA_VAGND
B9	+5V	B10	Video GND
B11	NC	B12	VGA_DDD
B13	VGA_HSYNC	B14	VGA_VSYNC
B15	VGA_DDC		

J2:COM1,COM2 Connector

Pin	Assignment	Pin	Assignment
A1	DCD#1/DT-	A2	RXD#1/DT+
A3	TXD#1/422R+	A4	DTR#1/422R-
A5	GND	A6	DSR#1
A7	RTS#1	A8	CTS#1
A9	RI#1		
B1	DCD#2	B2	RXD#2
B3	TXD#2	B4	DTR#2
B5	GND	B6	DSR#2
B7	RTS#2	B8	CTS#2
B9	RI#2		

J3:Audio Jack Connector

Pin	Assignment	Pin	Assignment
Blue	Line In	Green	Line Out
Pink	MIC		

J4:RJ45+USBx2 Connector

Pin	Assignment	Pin	Assignment
C1	+1.05V	C2	LAN1_MDIP0
C3	LAN1_MDIN0	C4	LAN1_MDIP1
C5	LAN1_MDIN1	C6	LAN1_MDIP2
C7	LAN1_MDIN2	C8	LAN1_MDIP3
C9	LAN1_MDIN3	C10	L1_MDC1
C11	LED1_LINK#	C12	LAN1_ACT-
C13	LAN1_LINK1000	C14	LAN1_LINK100
B1	USBV0	B2	USBD0N
B3	USBD0P	B4	USBG0
A1	USBV1	A2	USBD1N
A3	USBD1P	A4	USBG1

J5:RJ45+USBx2 Connector

Pin	Assignment	Pin	Assignment
C1	+1.05V	C2	LAN2_MDIP0
C3	LAN2_MDIN0	C4	LAN2_MDIP1
C5	LAN2_MDIN1	C6	LAN2_MDIP2
C7	LAN2_MDIN2	C8	LAN2_MDIP3
C9	LAN2_MDIN3	C10	L2_MDC1
C11	LED2_LINK#	C12	LAN2_ACT-
C13	LAN2_LINK1000	C14	LAN2_LINK100
B1	USBV2	B2	USBD2N
B3	USBD2P	B4	USBG2
A1	USBV3	A2	USBD3N
A3	USBD3P	A4	USBG3

J6: COM6 CC Talk Connector

Pin	Assignment	Pin	Assignment
1	CCTALK_V+	2	N/A
3	GND	4	CCTALK3

J7: USB x 2 Header

Pin	Assignment	Pin	Assignment
1	USBV6	2	USBV7
3	USBD6N	4	USBD7N
5	USBD6P	6	USBD7P
7	USBG6	8	USBG7

J8: USB Connector

Pin	Assignment
1	USBV5
2	USBD5N
3	USBD5P
4	USBG5
CG1	GND
CG2	GND

J9: USB Connector

Pin	Assignment
1	USBV4
2	USBD4N
3	USBD4P
4	USBG4
CG1	GND
CG2	GND

J10: COM4 RS-232 Connector

Pin	Assignment	Pin	Assignment
1	DCD#_4	2	RXD#_4
3	TXD#_4	4	DTR#_4
5	GND	6	DSR#_4
7	RTS#_4	8	CTS#_4
9	RI4#	10	NC

J11: COM3 RS-232 Connector

Pin	Assignment	Pin	Assignment
1	DCD#_3	2	RXD#_3
3	TXD#_3	4	DTR#_3
5	GND	6	DSR#_3
7	RTS#_3	8	CTS#_3
9	RI3#	10	NC

J12: LPC Debug Port Header

Pin	Assignment	Pin	Assignment
1	LAD0	2	VCC3
3	LAD1	4	PCI_RST#
5	LAD2	6	LFRAME#
7	LAD3	8	PCLK_TPM
		10	GND

J13: ATX 4P Connector

Pin	Assignment
1	GND
2	GND
3	+12V
4	+12V

J14: ATX 20P Connector

Pin	Assignment	Pin	Assignment
1	VCC3_ATX	11	VCC3_ATX
2	VCC3_ATX	12	NC
3	GND	13	GND
4	VCC	14	PS_ON#
5	GND	15	GND
6	VCC	16	GND
7	GND	17	GND
8	ATX_PWROK	18	NC
9	5VSB	19	VCC
10	+12V	20	VCC

J15: CFEX Connector

Pin	Assignment	Pin	Assignment
1	GND	26	VCC3
2	CLK_SPI_CFEX	27	GND
3	R_SPI_MISO_CFEX	28	GND
4	GND	29	SATA_TX3+
5	GND	30	SATA_TX3-
6	GND	31	SPI_CS0#_CFEX
7	SPI_MOSI_CFEX	32	GND
8	GND	33	SATA_RX3-
9	GND	34	SATA_RX3+
10	GND	35	SPI_WP#_CFEX
11	LAD0	36	SMB_CLK_MAIN
12	LAD1	37	V_3P3_EPW
13	VCC	38	VCC
14	LAD2	39	LFRAME#
15	LAD3	40	PLT_RST#
16	CFEX_LPC_CLK	41	SMB_DATA_MAIN
17	LDRQ#1	42	GND
18	NC	43	GND
19	NC	44	GND
20	GND	45	NC
21	SERIRQ	46	GND

22	NC	47	GND
23	NC	48	GND
24	GND	49	NC
25	GND	50	GND

J16: PCI-E x 16 Connector

Reference standard PCI-E definition SPEC

J17: System Reset Header

Pin	Assignment
Short 1-2	System Reset

J18: CF / CF-SATA Connector

Pin	Pure IDE Mode Definition	CF-SATA
1	DGND	DGND
8	DGND	AGND
10	DGND	(From Host to SATA) RX+
11	DGND	(From Host to SATA) RX-
12	DGND	AGND
13	VCC5	VCC5
14	DGND	AGND
15	DGND	(From Host to SATA) TX-
16	DGND	(From Host to SATA) TX+
17	DGND	AGND
38	VCC5	VCC5

J19: SAS COM PORT Pin Connector

Pin	Assignment	Pin	Assignment
1	Reserved TX	2	COM TX
3	GND	4	GND
5	Reserved RX	6	COM RX

J20: SATA / SATA DOM Connector

Pin	Assignment	Pin	Assignment
1	GND	2	PCH_SATA_TX0+
3	PCH_SATA_TX0-	4	GND
5	PCH_SATA_RX0-	6	PCH_SATA_RX0+
7	GND / 5V_DOM	CG1	GND
CG2	GND		

J21: SATA / SATA DOM Connector

Pin	Assignment	Pin	Assignment
1	GND	2	PCH_SATA_TX1+
3	PCH_SATA_TX1-	4	GND
5	PCH_SATA_RX1-	6	PCH_SATA_RX1+
7	GND / 5V_DOM	CG1	GND
CG2	GND		

J22: PIC Program Header

Pin	Assignment
1	VBATT_3V3
2	PIC_POWER-
3	GND
4	ICSP_PDATA
5	ICSP_PCLK

J23: SYSFANOUT Header

Pin	Assignment
1	GND
2	FANPWR2
3	SYSFANIN

J24: CPUFANOUT Header

Pin	Assignment
1	GND
2	FANPWR1
3	CPUFANIN

J25: SO-DIMM Connector

Reference standard SO-DIMM definition SPEC

J26: Power in Golden Finger 10P x2

Pin	Assignment	Pin	Assignment
A1	GND	B1	GND
A2	GND	B2	GND
A3	5VSB_GF	B3	5VSB_GF
A4	5VSB_GF	B4	5VSB_GF
A5	+12V	B5	+12V
A6	+12V	B6	+12V
A7	N/A	B7	OC15
A8	N/A	B8	N/A
A9	GND	B9	GND

A10	GND	B10	GND

J27: Golden Finger 36P x 2

Pin	Assignment	Pin	Assignment
A1	N/A	B1	N/A
A2	N/A	B2	N/A
A3	SPK_R+	B3	SPK_L+
A4	N/A	B4	GND
A5	N/A	B5	IN0
A6	IN1	B6	IN2
A7	IN3	B7	N/A
A8	N/A	B8	N/A
A9	IN4	B9	Intrusion0
A10	IN5	B10	Intrusion1
A11	IN6	B11	Intrusion2
A12	IN7	B12	Intrusion3
A13	IN8	B13	Intrusion4
A14	N/A	B14	Intrusion5
A15	N/A	B15	N/A
A16	IN9	B16	N/A
A17	N/A	B17	N/A
A18	IN10	B18	IN11
A19	IN12	B19	IN17
A20	IN13	B20	IN14
A21	IN15	B21	IN16
A22	N/A	B22	N/A
A23	OC0	B23	OC1
A24	OC2	B24	OC3
A25	OC4	B25	OC5
A26	OC6	B26	N/A
A27	N/A	B27	N/A
A28	OC7	B28	N/A
A29	OC8	B29	N/A
A30	OC9	B30	OC10
A31	OC11	B31	OC12
A32	OC13	B32	N/A
A33	OC14	B33	OC16
A34	N/A	B34	OC17
A35	GND	B35	GND
A36	GND	B36	GND

D1: Power and HDD LED

Pin	Assignment
Red	HDD LED
Green	Power LED

JP4 : COM5 4-wire RS-485 Header (Not standard RS485 pin definition)

Pin	Assignment	Pin	Assignment
1	TD2_A	2	RD2_C
3	TD2_B	4	RD2_H
5	GND	6	GND

JP14: JTAG Programming Header

JP14	Function
Pin 1	TDO
Pin 2	TDI
Pin 3	TMS
Pin 4	X

JP16: JTAG Programming Header

JP16	Function
Pin 1	VCCO
Pin 2	GND
Pin 3	TCK
Pin 4	X

JP20: FPGA 3PX2 GPIO Headr

Pin	Assignment	Pin	Assignment
1	GPIO0	2	GPIO2
3	GPIO1	4	GPIO3
5	GND	6	VCC

JP23: SATA Power Headr

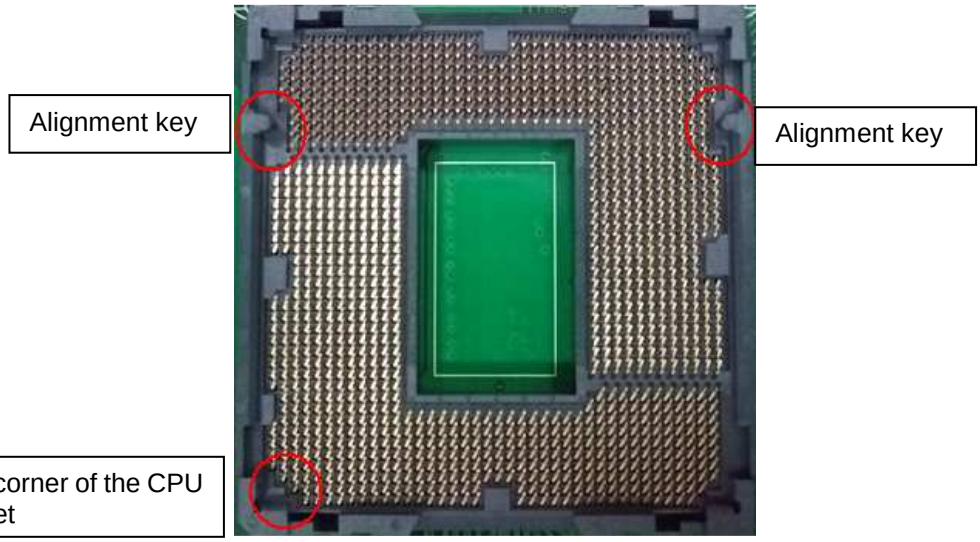
Pin	Assignment	Pin	Assignment
1	+12V	2	GND
3	GND	4	VCC

Chapter 3
System Installation

This chapter provides you with instructions to set up your system. The additional information is enclosed to help you set up onboard PCI device and handle Watch Dog Timer (WDT) and operation of GPIO in software programming.

3.1 Intel LGA-1155 Processor

LGA-1155 CPU Socket

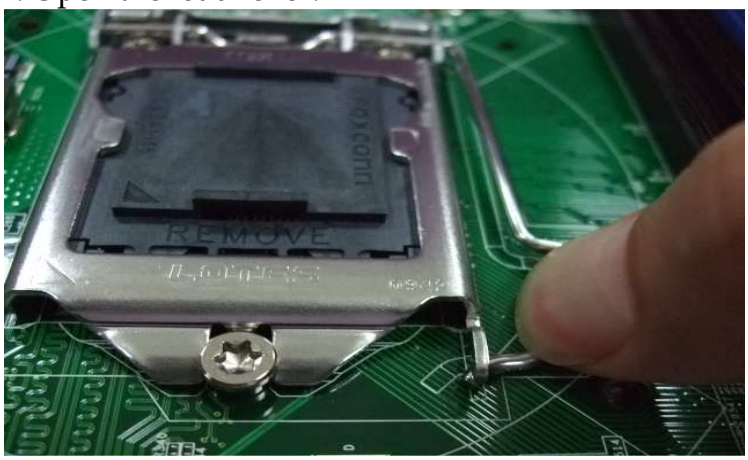


LGA-1155 CPU

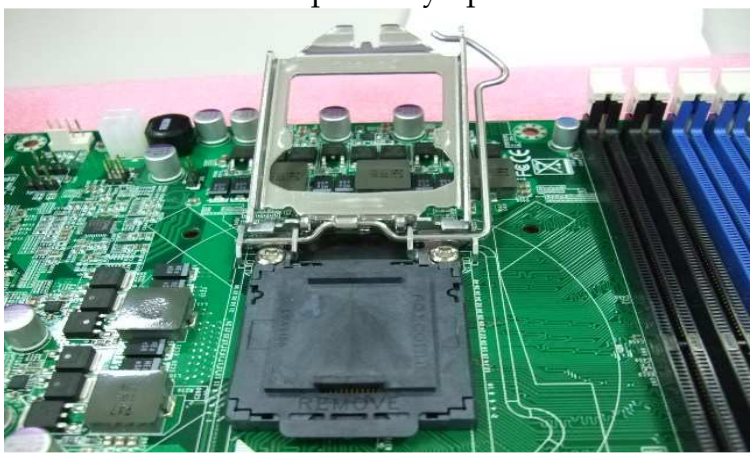
Please remember to locate the alignment keys on the CPU socket of the motherboard and the notches on the CPU.

LGA-1155 CPU Installation Steps

Before install the CPU, please make sure to turn off the power first!!
1. Open the load lever.

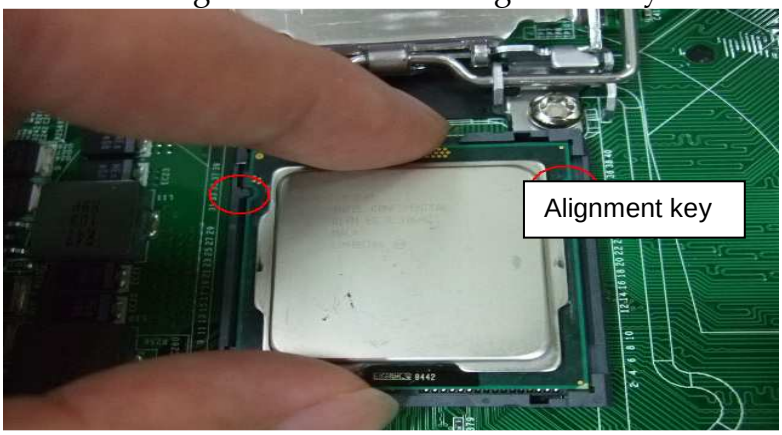


2. Lift the load lever up to fully open.

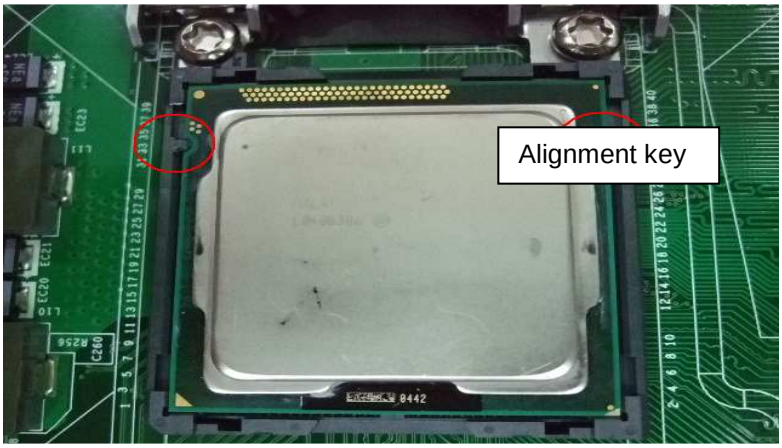


3. Remove the plastic cap on the CPU socket. Before you install the CPU, always cover it to protect the socket pin.

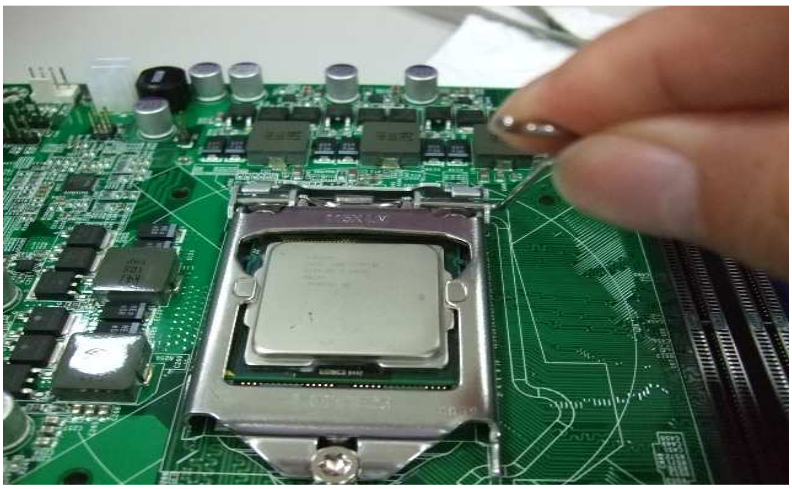
4. After confirming the CPU direction for correct mating, put down the CPU in the socket housing frame. Note that alignment keys are matched.



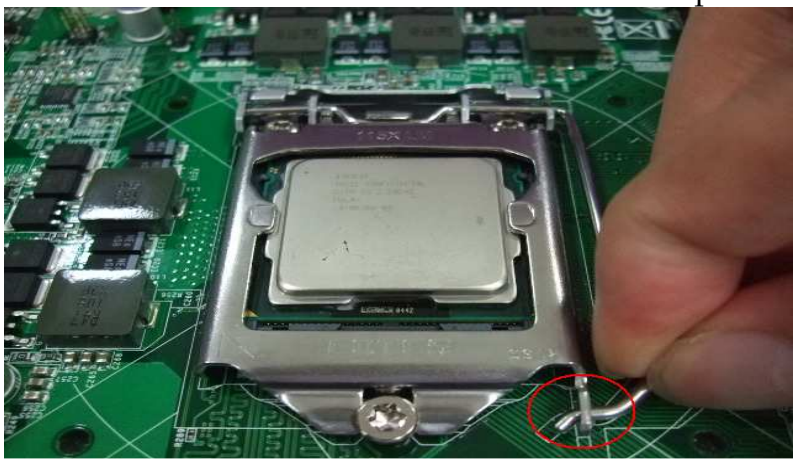
5. Make sure the CPU has been seated well into the socket. If not, take out the CPU and reinstall.



6. Engage the load lever while pressing down lightly onto the load plate.



7. Push the CPU socket lever back into its locked position.



8. Please make sure four hooks are in proper position before you install the cooler.

3.2 Main Memory

PGB-5120S provide 1 x204 pin DIMM sockets (Single Channel) which supports 1066/1333 DDR3-SDRAM as main memory, Non-ECC (Error Checking and Correcting), non-register functions. The maximum memory can be up to 4GB. Memory clock and related settings can be detected by BIOS via SPD interface.

For system compatibility and stability, do not use memory module without brand. Memory configuration can be set to either one double-sided DIMM in one DIMM socket or two single-sided DIMM in both sockets.

Beware of the connection and lock integrity from memory module to socket. Inserting improperly it will affect the system reliability.

Before locking, make sure that all modules have been fully inserted into the card slots.

Note:
To insure the system stability, please do not change any of DRAM parameters in BIOS setup to modify system the performance without acquired technical information

3.3 Installing the Single Board Computer

To install your PGB-5120S into standard chassis or proprietary environment, please perform the following:

Step 1 : Check all jumpers setting on proper position

Step 2 : Install and configure CPU and memory module on right position
Step 3 : Place PGB-5120S into the dedicated position in the system
Step 4 : Attach cables to existing peripheral devices and secure it

WARNING
Please ensure that SBC is properly inserted and fixed by mechanism.

Note:
Please refer to section 3.3.1 to 3.3.4 to install INF/VGA/LAN/Audio drivers.

3.3.1 Intel® BD82H61 PCH Chipset

PGB-5120S uses Intel BD82H61 PCH chipset. It's a new chipset that some old operating systems might not be able to recognize. To overcome this compatibility issue, for Windows operating systems such as Windows XP, please install its INF before any of other Drivers are installed. You can find very easily this chipset component driver in PGB-5120S CD-title.

3.3.2 Intel® Core i processors integrated Graphics Engine

PGB-5120S uses Intel® Core i processors integrated graphic engine to gain an outstanding graphic performance. PGB-5120S supports CRT & DVI-D dual display. This combination makes PGB-5120S an excellent piece of multimedia hardware.

Please find the Graphic drivers in the PGB-5120S CD-title. Drivers support Windows XP/Win7.

3.3.3 Realtek Ethernet Controller

Please find Realtek RTL8111F-CG LAN driver in /Ethernet directory of PGB-5120S CD-title. The drivers support Windows XP/Win7.

3.3.4 Audio Controller

Please find Realtek ALC886-GR (High Definition Audio driver) form PGB-5120S CD-title. The drivers support Windows XP/Win7.

3.4 Clear CMOS Operation

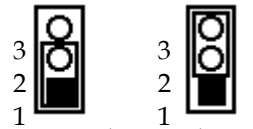
The following table indicates how to enable/disable Clear CMOS Function hardware circuit by putting jumpers at proper position.

JP17: CMOS Clear Header

JP17	Function
Short 1-2	Normal Operation *
Short 2-3	Clear CMOS Contents

Note : The " * " mark for default setting

The following table indicates how to enable/disable Clear CMOS Function hardware circuit by putting jumpers at proper position.



Normal Clear

Chapter 4
BIOS Setup Information

PGB-5120S uses AMI BIOS structure stored in Flash ROM. These BIOS has a built-in Setup program that allows users to modify the basic system configuration easily. This type of information is stored in CMOS RAM so that it is retained during power-off periods. When system is turned on, PGB-5120S communicates with peripheral devices and checks its hardware resources against the configuration information stored in the CMOS memory. If any error is detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors are significant enough to abort the start up.

4.1 Entering Setup -- Launch System Setup

Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press <Del>or <F2> key will enter BIOS setup screen.

Press <Del>or <F2> to enter SETUP

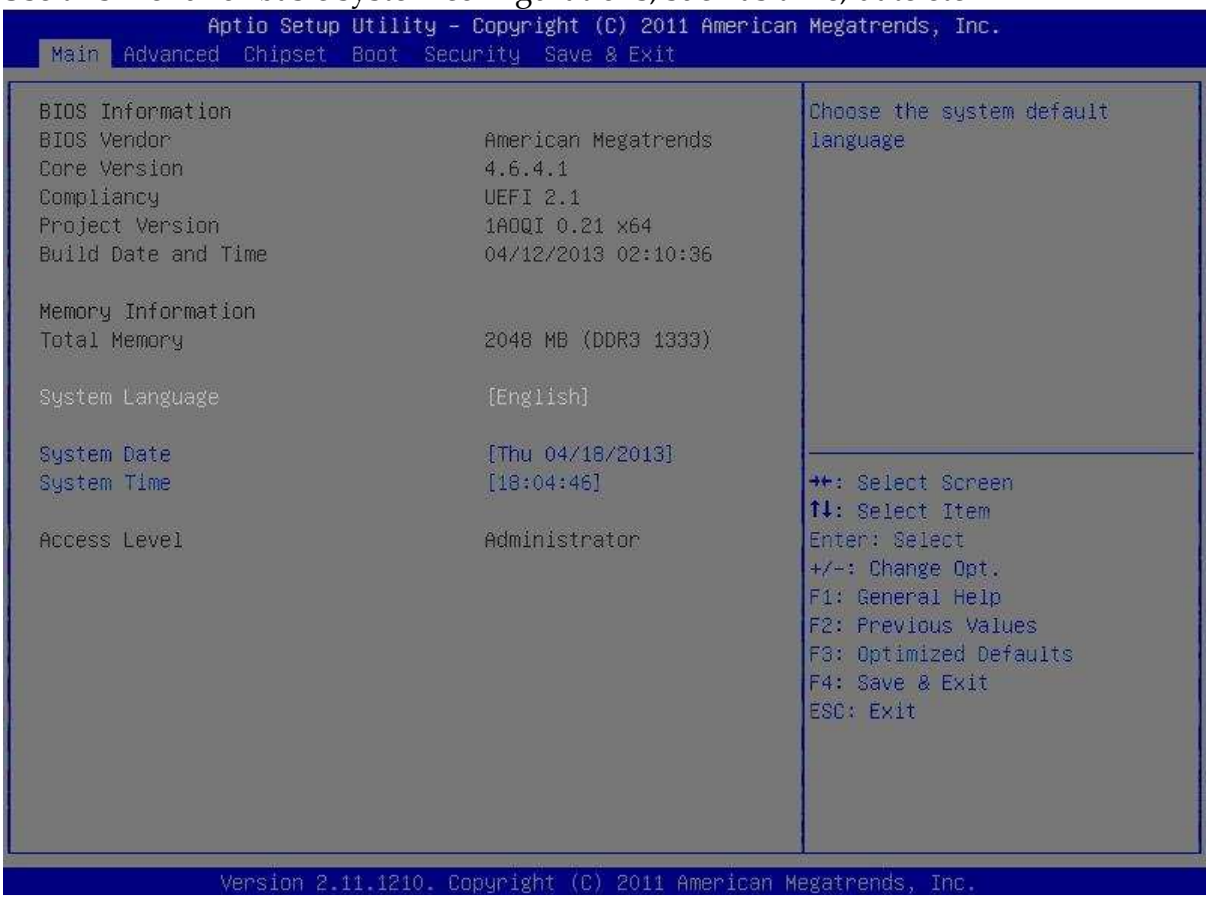
If the message disappears before responding and still wish to enter Setup, please restart the system by turning it OFF and On or pressing the RESET button. It can be also restarted by pressing <Ctrl>, <Alt>, and <Delete> keys on keyboard simultaneously.

Press <F1> to Run SETUP or Resume

The BIOS setup program provides a General Help screen. The menu can be easily called up from any menu by pressing <F1>. The Help screen lists all the possible keys to use and the selections for the highlighted item. Press <Esc> to exit the Help screen.

4.2 Main

Use this menu for basic system configurations, such as time, date etc



BIOS Information, Memory Information
These items show the firmware and memory specifications of your system. Read only.

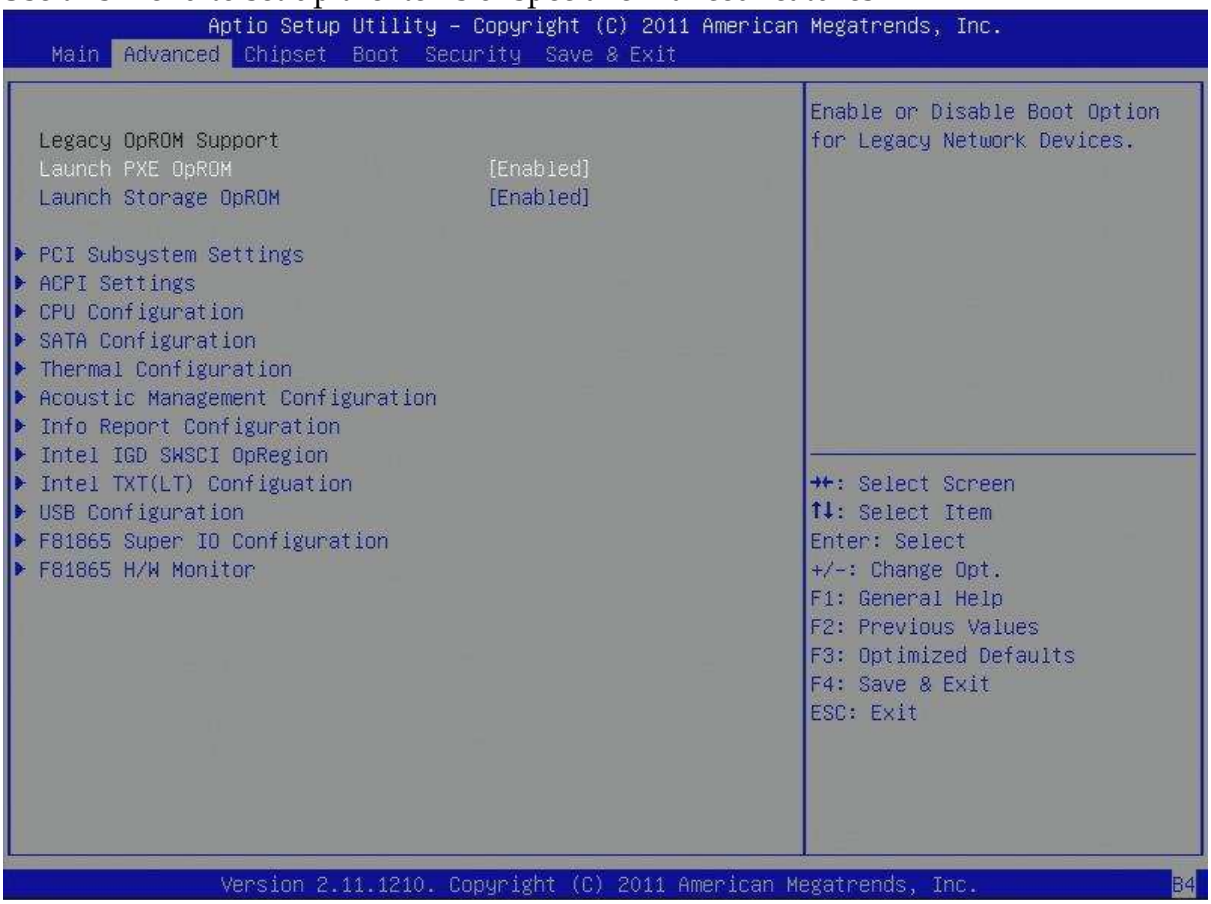
System Language
Choose the system default language.
Choices: English.

System Date
The date format is <Day>, <Month> <Date> <Year>. Use [+] or [−] to configure system Date.

System Time
The time format is <Hour> <Minute> <Second>. Use [+] or [−] to configure system Time

4.3 Advanced

Use this menu to set up the items of special enhanced features

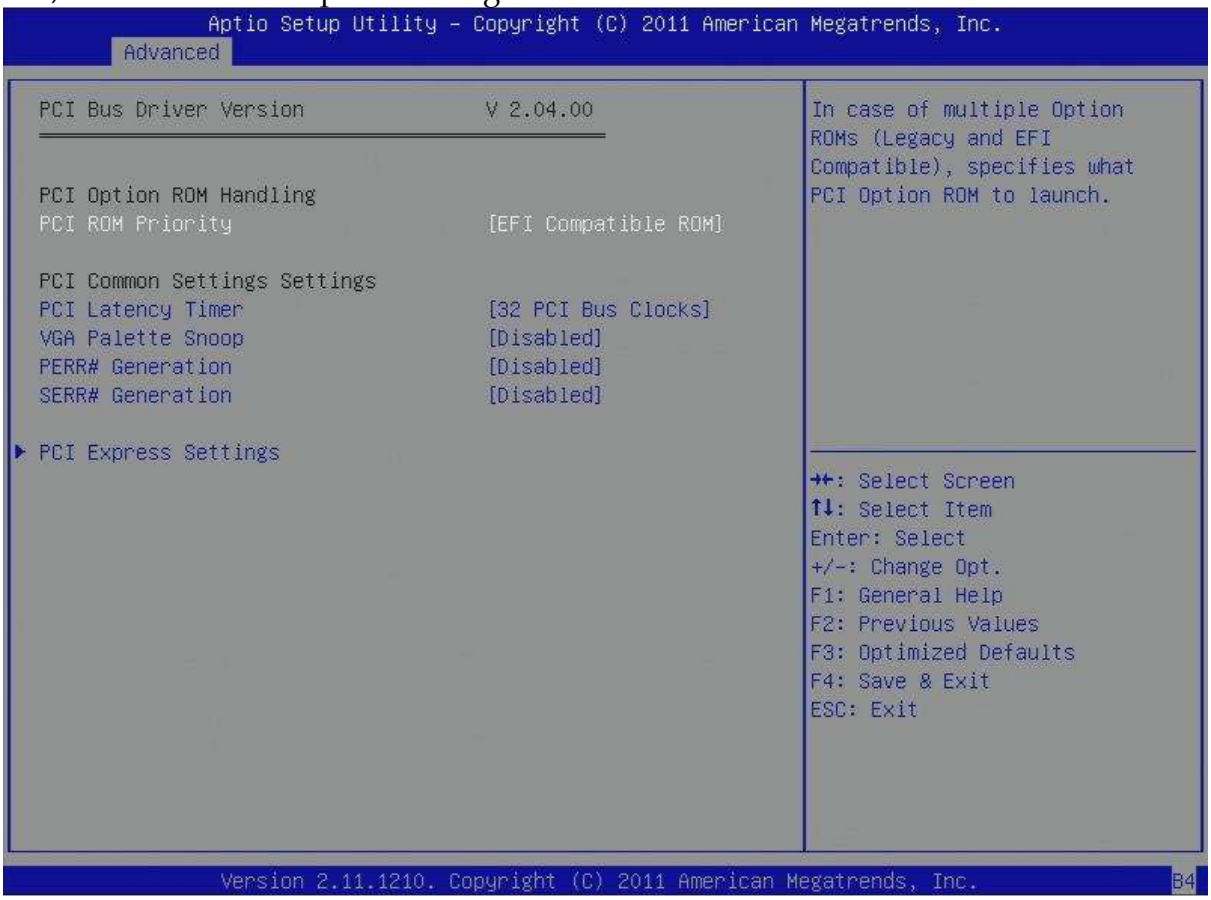


Launch PXE OpROM
Enable or Disable Boot Option for Legacy Network Devices.
Choices: Disabled, Enabled.

Launch Storage OpROM
Enable or Disable Boot Option for Legacy Mass Storage devices with Option ROM.
Choices: Disabled, Enabled.

PCI Subsystems Settings

PCI, PCI-X and PCI Express Settings


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
PCI Bus Driver Version V 2.04.00
PCI Option ROM Handling
PCI ROM Priority [EFI Compatible ROM]
PCI Common Settings Settings
PCI Latency Timer [32 PCI Bus Clocks]
VGA Palette Snoop [Disabled]
PERR# Generation [Disabled]
SERR# Generation [Disabled]
PCI Express Settings
In case of multiple Option ROMs (Legacy and EFI Compatible), specifies what PCI Option ROM to launch.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.
B4

PCI ROM Priority

In case of multiple Option ROMs (Legacy and EFI Compatible), specifies what PCO Option ROM to launch.
Choices: Legacy ROM, EFI Compatible ROM.

PCI Latency Timer

Value to be programmed into PCI Latency Timer Register.
Choices: 32 PCI Bus Clocks, 64 PCI Bus Clocks, 96 PCI Bus Clocks, 128 PCI Bus Clocks, 160 PCI Bus Clocks, 192 PCI Bus Clocks, 224 PCI Bus Clocks, 248 PCI Bus Clocks.

VGA Palette Snoop

Enables or Disables VGA Palette Registers Snooping.
Choices: Disabled, Enabled.

PERR# Generation
Enables or Disables PCI Device to Generate PERR#.
Choices: Disabled, Enabled.
This item shows a Diagnostic Summary Screen during boot up. The boot process will stop by displaying this screen until a key is pressed.
The choice: Enabled, Disabled.

SERR# Generation
Enables or Disables PCI Device to Generate SERR#.
Choices: Disabled, Enabled.

PCI Express Settings
Change PCI Express Devices Settings

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
PCI Express Device Register Settings
Relaxed Ordering [Disabled]
Extended Tag [Disabled]
No Snoop [Enabled]
Maximum Payload [Auto]
Maximum Read Request [Auto]
PCI Express Link Register Settings
ASPM Support [Disabled]
WARNING: Enabling ASPM may cause some
PCI-E devices to fail
Extended Synch [Disabled]
Link Training Retry [5]
Link Training Timeout (uS) 100
Unpopulated Links [Keep Link ON]
Enables or Disables PCI Express Device Relaxed Ordering.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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Relaxed Ordering
Enables or Disables PCI Express Device Relaxed Ordering.
Choices: Disabled, Enabled.

Extended Tag
If Enabled allows Device to use 8-bit Tag field as a requester.
Choices: Disabled, Enabled.

No Snoop
Enables or Disables PCI Express Device No Snoop option.
Choices: Disabled, Enabled.

Maximum Payload
Set Maximum Payload of PCI Express Device or allow System BIOS to select the value.
Choices: Auto, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, 4096 Bytes.

Maximum Read Request
Set Maximum Read Request size of PCI Express Device or allow System BIOS to select the value.
Choices: Auto, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, 4096 Bytes.

ASPM Support
Set the ASPM Level: Force L0 – Force all links to L0s State: AUTO – BIOS auto configure: DISABLE – Disables ASPM.
Choices: Disabled, Auto, Force L0s.

Extended Synch
If Enabled allows generation of Extended Synchronization patterns.
Choices: Disabled, Enabled.

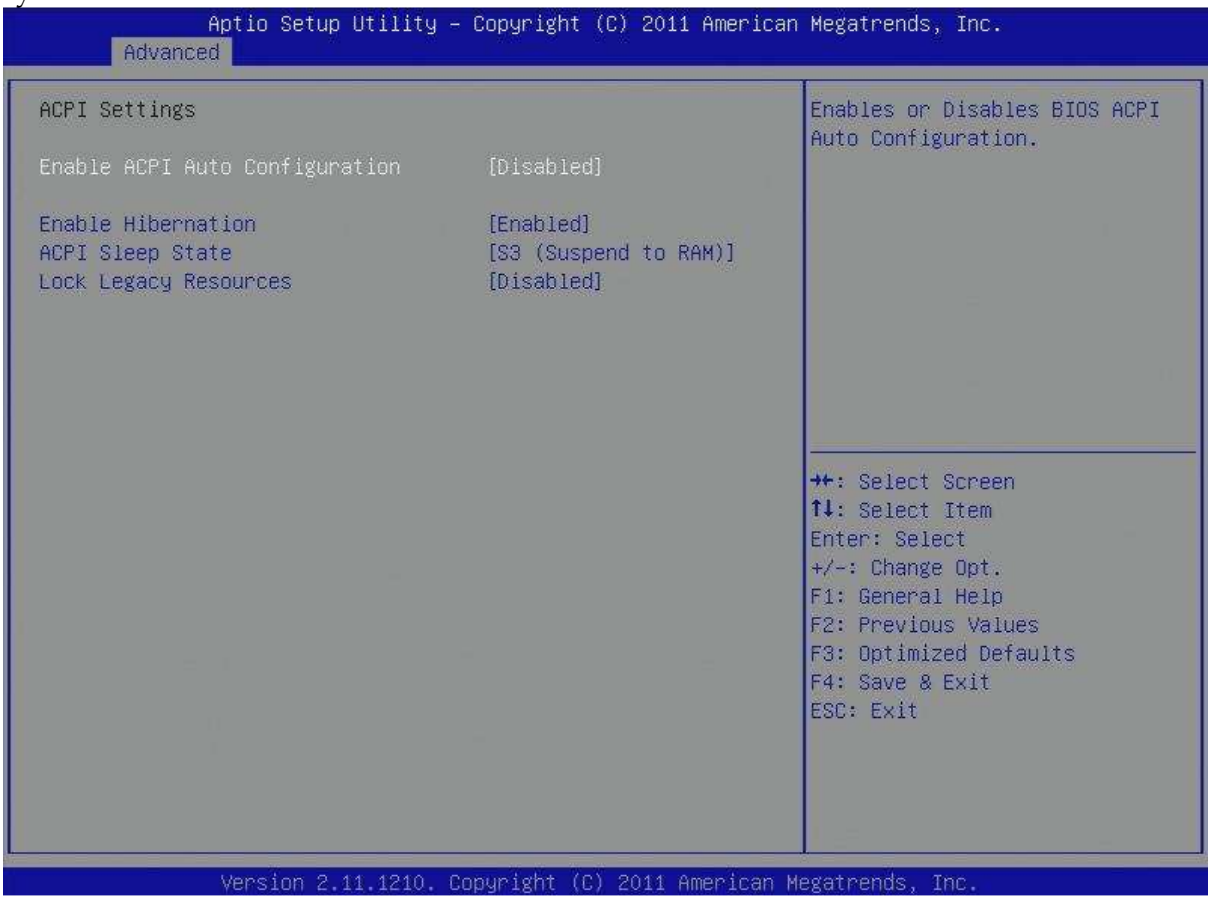
Link Training Retry
Defines number of Retry Attempts software will take to retrain the link if previous training attempt was unsuccessful.
Choices: Disabled, 2, 3, 5.

Link Training Timeout (uS)
Defines number of Microseconds software will wait before polling 'Link Training' bit in Link Status register. Value range from 1 to 100 uS.
Choices: 1 to 100.

Unpopulated Links
In Order to save power, software will disable unpopulated PCI Express links, if this option set to 'Disable Link'.
Choices: Keep Link On, Disable Link.

ACPI Settings

System ACPI Parameters


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
ACPI Settings
Enable ACPI Auto Configuration [Disabled]
Enable Hibernation [Enabled]
ACPI Sleep State [S3 (Suspend to RAM)]
Lock Legacy Resources [Disabled]
Enables or Disables BIOS ACPI Auto Configuration.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.

Enabled ACPI Auto Configuration

Enables or Disables BIOS ACPI Auto Configuration.
Choices: Disabled, Enabled.

Enabled Hibernation

Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
Choices: Disabled, Enabled.

ACPI Sleep State

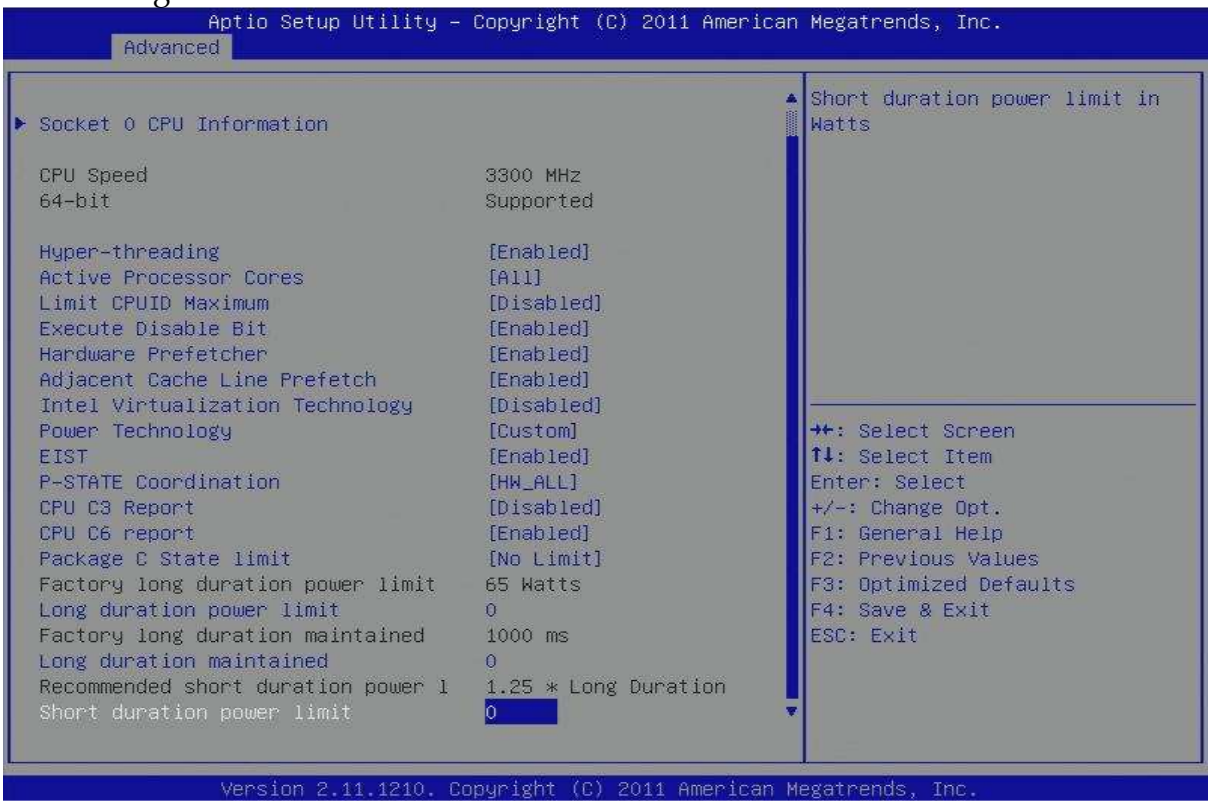
Select the highest ACPI Sleep state the system will enter when the SUSPEND button is pressed.
Choices: Suspend Disabled, S1 (CPU Stop Clock), S3 (Suspend to RAM).

Lock Legacy Resources

Enables or Disables Lock of Legacy Resources.
Choices: Disabled, Enabled.

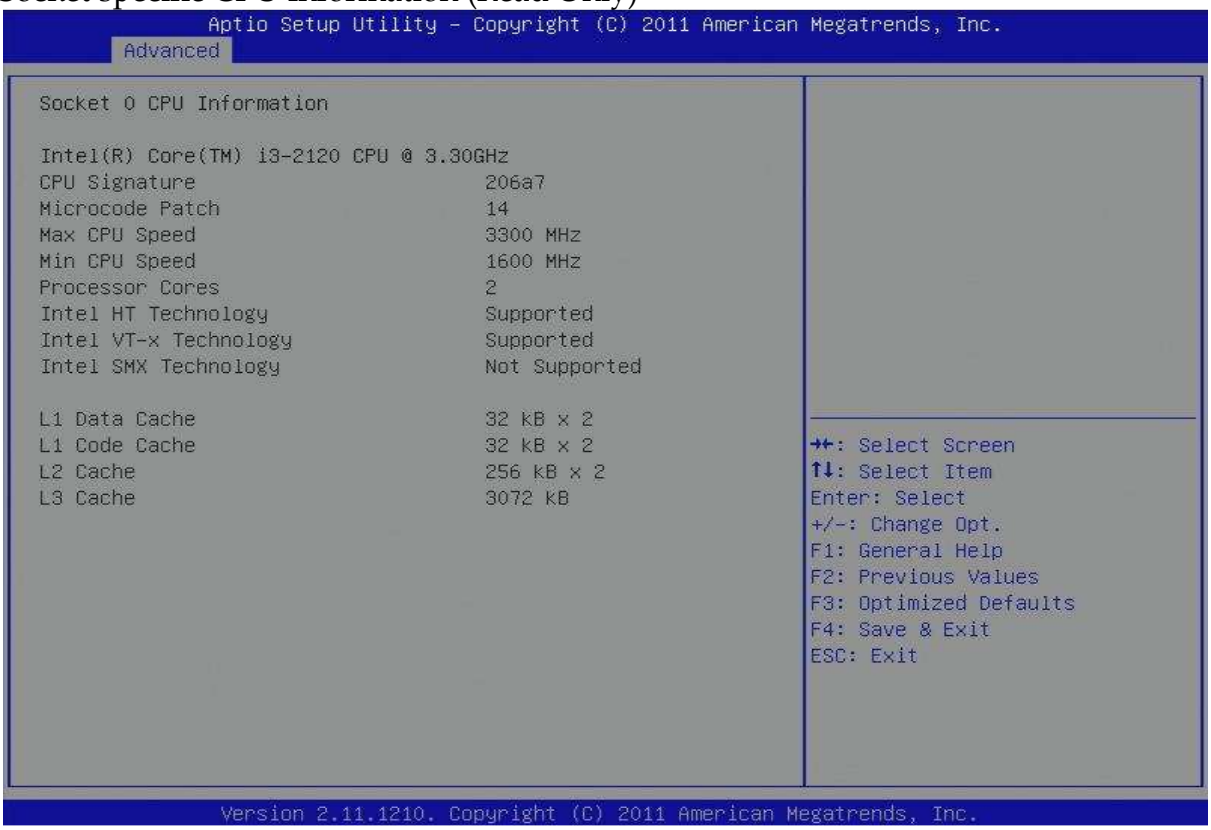
CPU Configuration

CPU Configuration Parameters


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
Socket 0 CPU Information
CPU Speed 3300 MHz
64-bit Supported
Hyper-threading [Enabled]
Active Processor Cores [All]
Limit CPUID Maximum [Disabled]
Execute Disable Bit [Enabled]
Hardware Prefetcher [Enabled]
Adjacent Cache Line Prefetch [Enabled]
Intel Virtualization Technology [Disabled]
Power Technology [Custom]
EIST [Enabled]
P-STATE Coordination [HW_ALL]
CPU C3 Report [Disabled]
CPU C6 report [Enabled]
Package C State limit [No Limit]
Factory long duration power limit 65 Watts
Long duration power limit 0
Factory long duration maintained 1000 ms
Long duration maintained 0
Recommended short duration power l 1.25 * Long Duration
Short duration power limit 0
Short duration power limit in Watts
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.

Socket 0 CPU Information

Socket specific CPU Information (Read Only)


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
Socket 0 CPU Information
Intel(R) Core(TM) i3-2120 CPU @ 3.30GHz
CPU Signature 206a7
Microcode Patch 14
Max CPU Speed 3300 MHz
Min CPU Speed 1600 MHz
Processor Cores 2
Intel HT Technology Supported
Intel VT-x Technology Supported
Intel SMX Technology Not Supported
L1 Data Cache 32 kB x 2
L1 Code Cache 32 kB x 2
L2 Cache 256 kB x 2
L3 Cache 3072 kB
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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Hyper-Threading
Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When Disabled only one thread per enabled core is enabled.
Choices: Disabled, Enabled.

Active Processor Cores
Number of cores to enable in each processor package.
Choices: All, 1.

Limit CPUID Maximum
Disabled for Windows XP.
Choices: Disabled, Enabled.

Execute Disable Bit
XP can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3.).
Choices: Disabled, Enabled.

Hardware Prefetcher
To turn on/off the Mid Level Cache (L2) streamer prefetcher.
Choices: Disabled, Enabled.

Adjacent Cache Line Prefetch
To turn on/off the prefetching of adjacent cache lines.
Choices: Disabled, Enabled.

Intel Virtualization Technology
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Choices: Disabled, Enabled.

Power Technology
Enable the power management features.
Choices: Disabled, Energy Efficient, Custom.

EIST
Enabled/Disabled Intel SpeedStep.
Choices: Disabled, Enabled.

P-STATE Coordination
Change P-STATE Coordination type.
Choices: HW_ALL, SW_ALL, SW_ANY.

CPU C3 Report
Enable/Disable CPU C3 (ACPI C2) report to OS.
Choices: Disabled, ACPI C-2, ACPI C-3.

CPU C6 Report
Enable/Disable CPU C6 (ACPI C3) report to OS.
Choices: Disabled, Enabled.

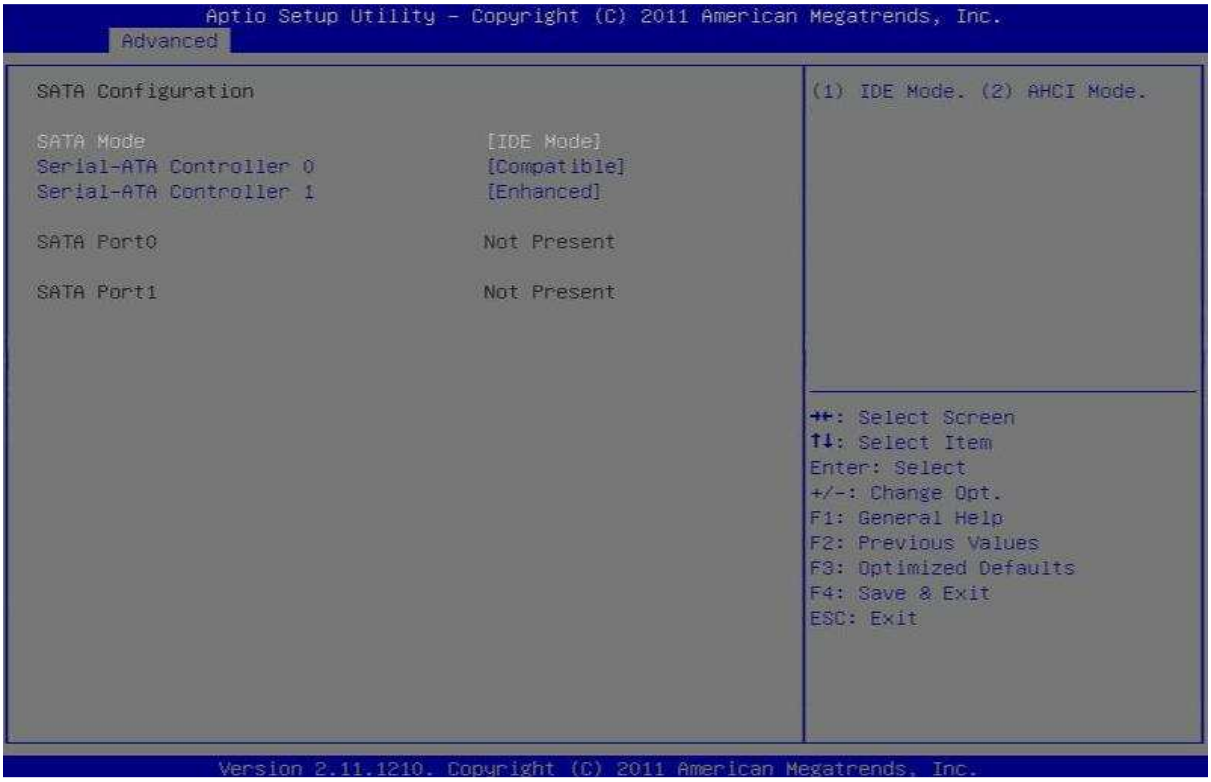
Package C State limit
Package C State limit.
Choices: C0, C2, C6, C7, No Limit.

Long duration power limit
Long duration power limit in Watts.
Choices: 0-255.

Long duration maintained
Time window which the long duration power is maintained.
Choices: 0-32000.

Short duration power limit
Short duration power limit in Watts.
Choices: 0-255.

SATA Configuration
SATA Devices Configuration

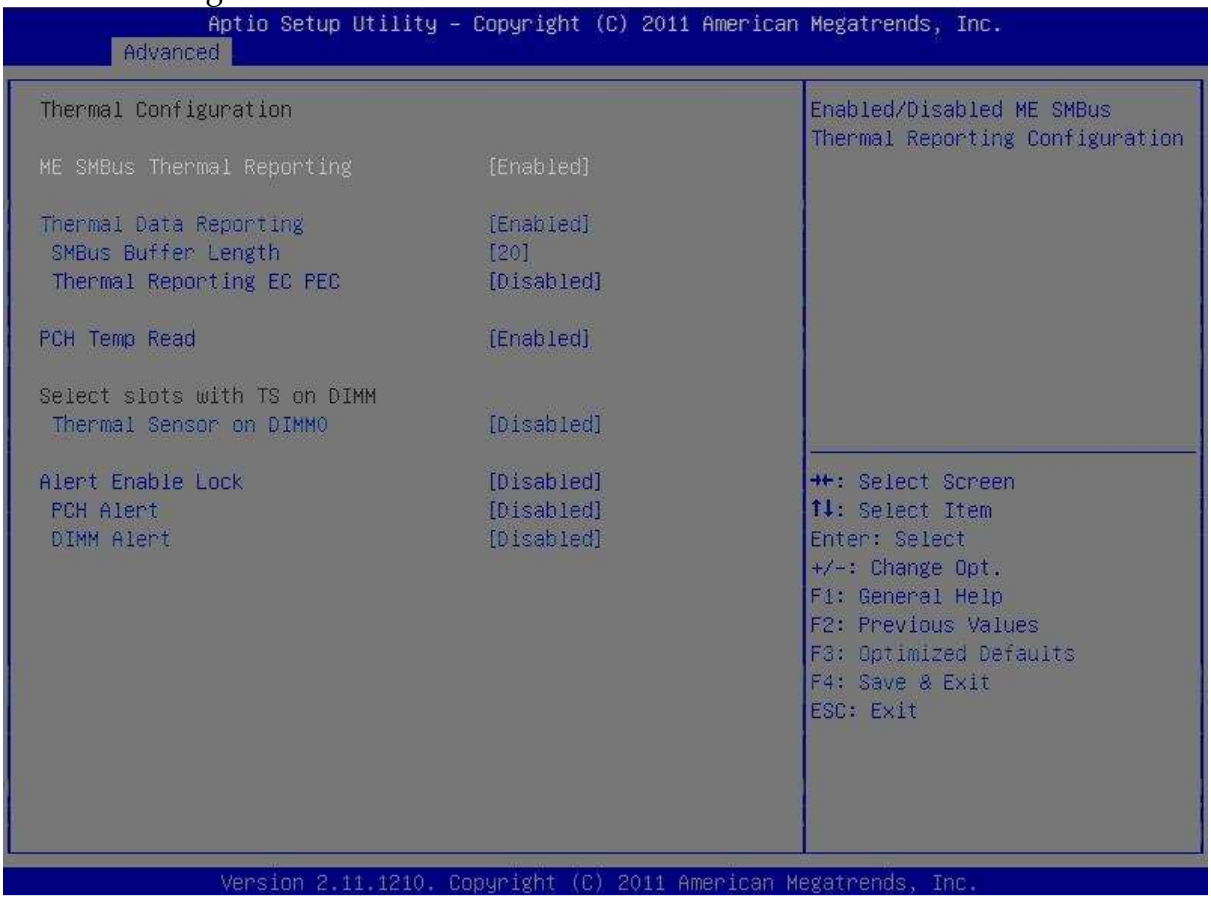


SATA Mode
(1) IDE Mode. (2) AHCI mode.
Choices: Disabled, IDE Mode, AHCI Mode.

Serial-ATA Controller 0
Enabled/Disabled Serial ATA Controller 0.
Choices: Disabled, Enhanced, Compatible.

Serial-ATA Controller 1
Enabled/Disabled Serial ATA Controller 1.
Choices: Disabled, Enhanced.

Thermal Configuration
Thermal Configuration


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
Thermal Configuration
ME SMBus Thermal Reporting [Enabled]
Thermal Data Reporting [Enabled]
SMBus Buffer Length [20]
Thermal Reporting EC PEC [Disabled]
PCH Temp Read [Enabled]
Select slots with TS on DIMM
Thermal Sensor on DIMM0 [Disabled]
Alert Enable Lock [Disabled]
PCH Alert [Disabled]
DIMM Alert [Disabled]
Enabled/Disabled ME SMBus Thermal Reporting Configuration
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.

ME SMBus Thermal Reporting
Enabled/Disabled ME SMBus Thermal Reporting Configuration.
Choices: Disabled, Enabled.

Thermal Data Reporting
Thermal Data Reporting Enable.
Choices: Disabled, Enabled.

SMBus Buffer Length

SMBus Block Read message length for EC.
Choices: 1, 2, 5, 9, 10, 14, 20.

Thermal Reporting EC PEC
Enable Packet Error Checking (PEC) for SMBus Block Read.
Choices: Disabled, Enabled.

PCH Temp Read
PCH Temperature Read Enable.
Choices: Disabled, Enabled.

Thermal Sensor on DIMM0
Thermal Sensor on DIMM0.
Choices: Disabled, Enabled.

Alert Enable Lock
Lock all Alert Enable settings.
Choices: Disabled, Enabled.

PCH Alert
PCH Alert pin enable.
Choices: Disabled, Enabled.

DIMM Alert
DIMM Alert pin enable
Choices: Disabled, Enabled.

Acoustic Management Configuration

Menu for configuring Automatic Acoustic Management

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
Acoustic Management Configuration
Automatic Acoustic Management [Disabled]
Option to Enable or Disable Automatic Acoustic Management
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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Automatic Acoustic Management

Option to Enable or Disable Automatic Acoustic Management.
Choices: Enabled, Disabled.

Info Report Configuration

Info Report Configuration

Post Report
Post Report Support Enabled/Disabled.
Choices: Disabled, Enabled.

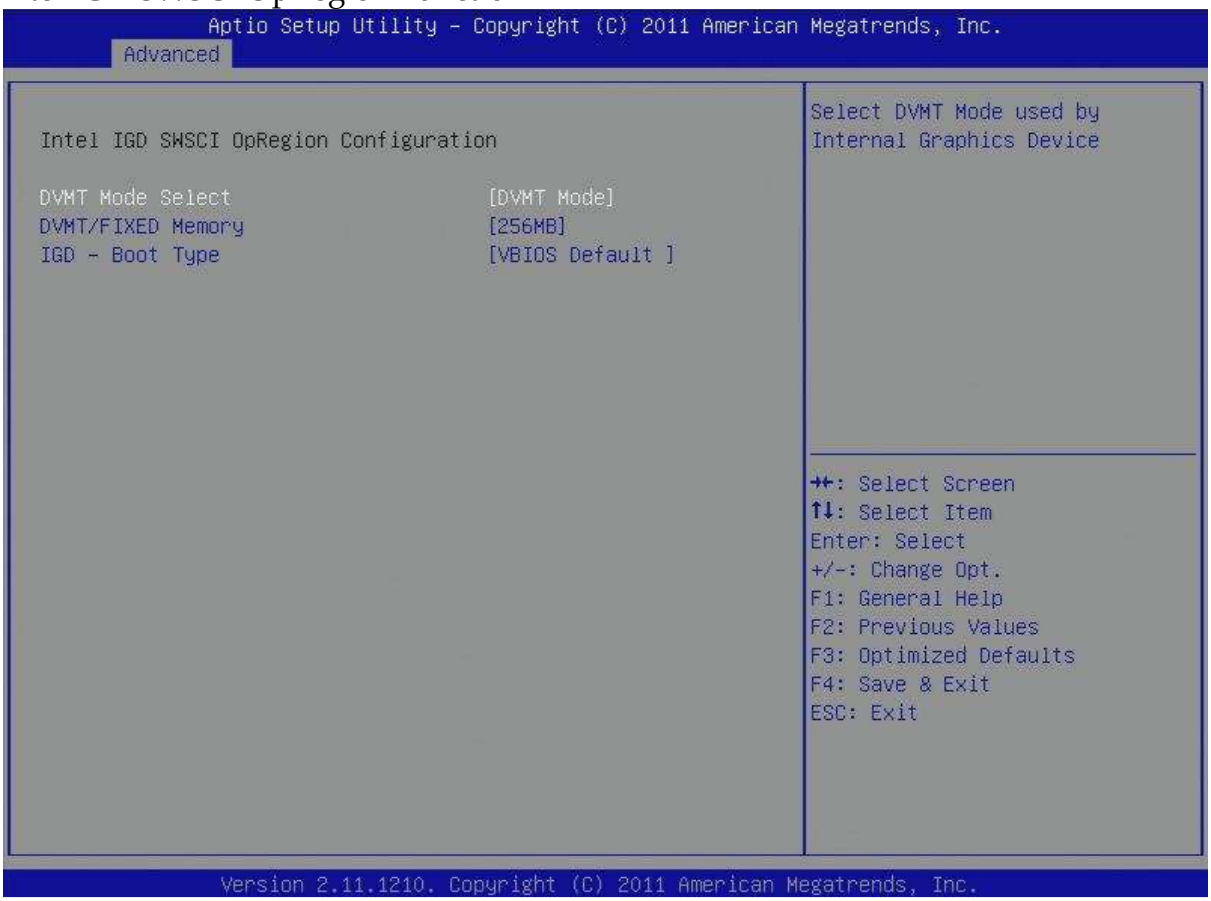
Delay Time
Post Report Wait Time: 0~10 Seconds.
Choices: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, Until Press Esc.

Info Error Message
Info Error Message Support Enabled/Disabled.
Choices: Disabled, Enabled.

Summary Screen
Summary Screen Support Enabled/Disabled..
Choices: Disabled, Enabled.

Delay Time
Post Report Wait Time: 0~10 Seconds.
Choices: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, Until Press Esc.

Intel IGD SWSCI Configuration
Intel IGD SWSCI OpRegion Function


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
Intel IGD SWSCI OpRegion Configuration
DVMT Mode Select [DVMT Mode]
DVMT/FIXED Memory [256MB]
IGD - Boot Type [VBIOS Default]
Select DVMT Mode used by Internal Graphics Device
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.

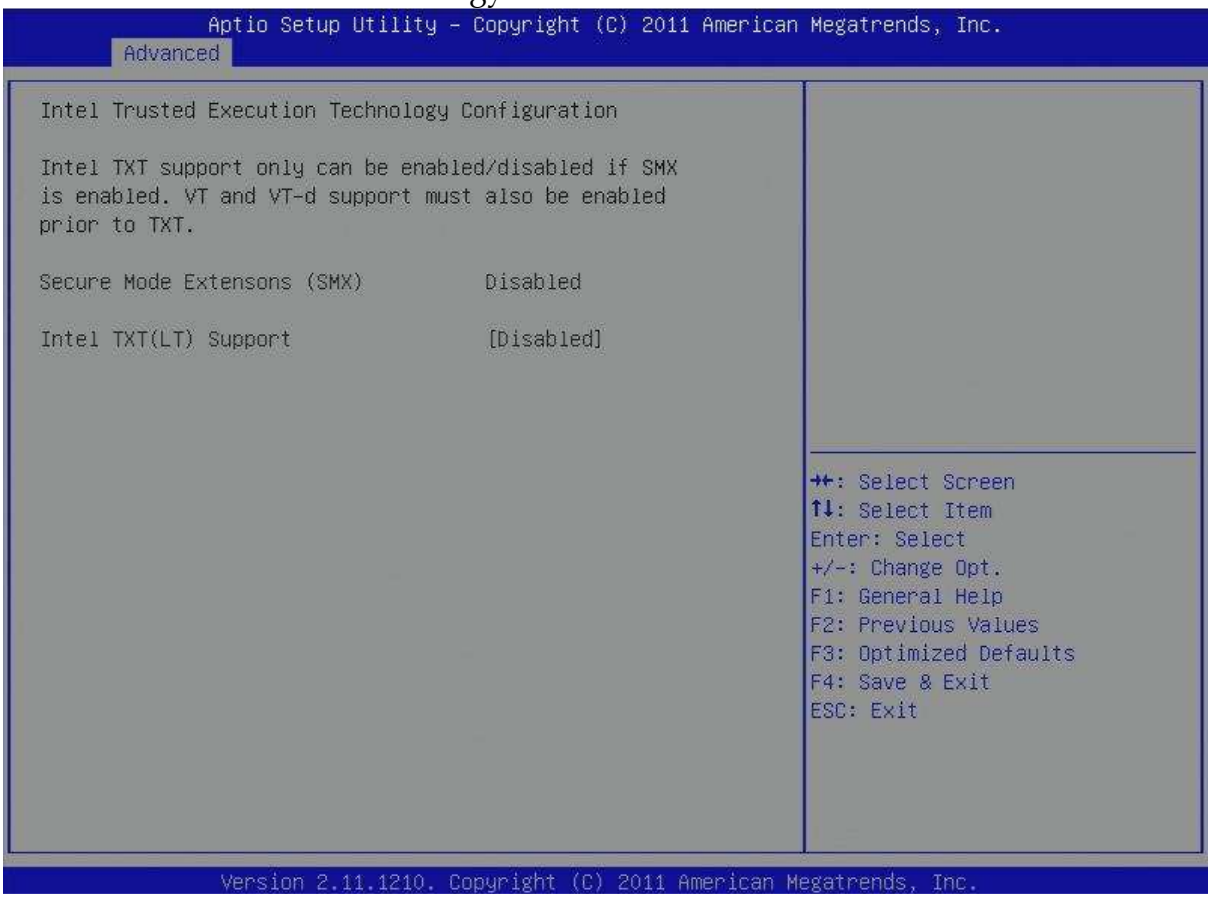
DVMT Mode Select

Select DVMT Mode used by Internal Graphic Device.
Choices: Fixed Mode, DVMT Mode.

DVMT/FIXED Memory
Select DVMT/FIXED Mode Memory size used by Internal Graphic Device.
Choices: 128MB, 256MB, Maximum.

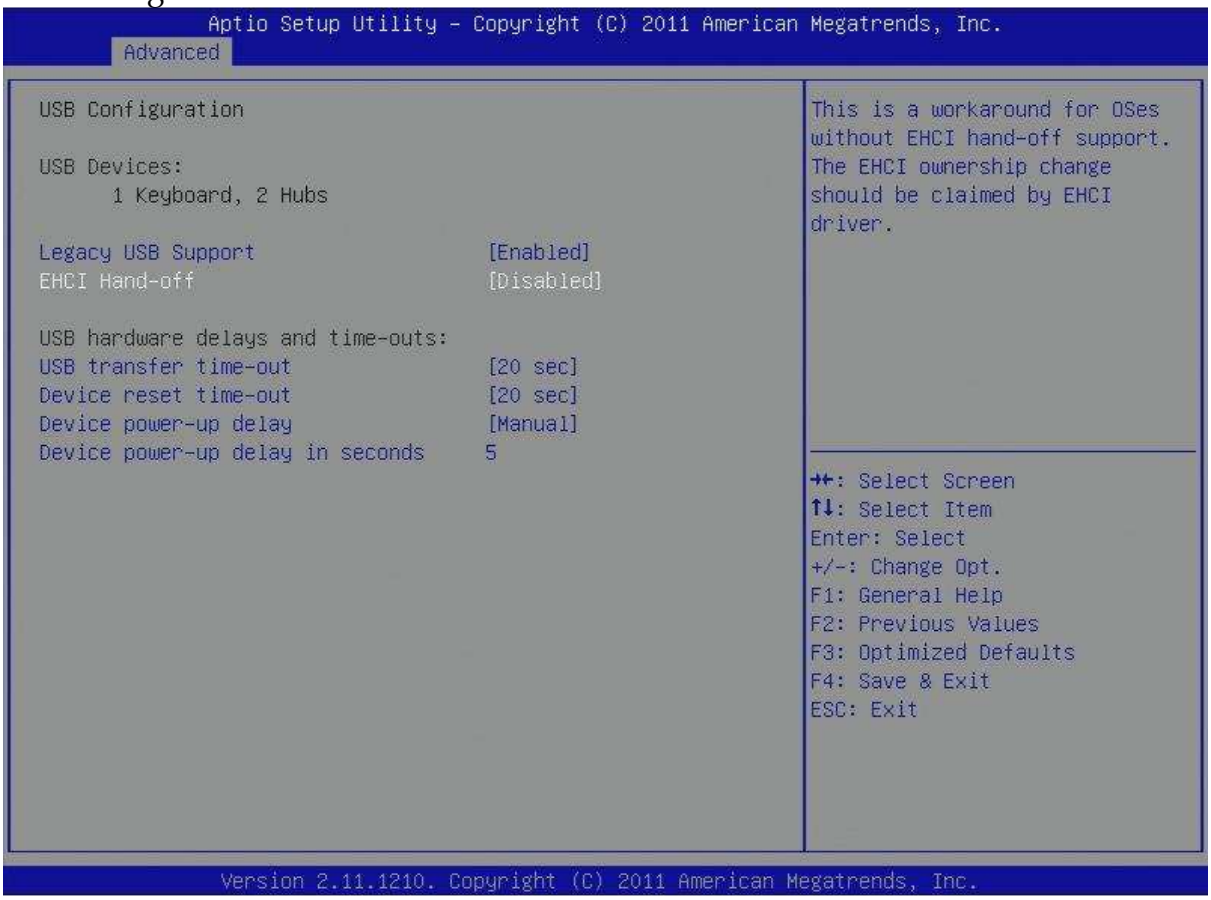
IGD – Boot Type
Select the Video Device which will be activated during POST. This has no effect if external graphics present.
Choices: VBIOS Default, CRT, DVI, CRT+DVI.

Intel TXT(LT) Configuration
Intel Trusted Execution Technology


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
Intel Trusted Execution Technology Configuration
Intel TXT support only can be enabled/disabled if SMX is enabled. VT and VT-d support must also be enabled prior to TXT.
Secure Mode Extensons (SMX) Disabled
Intel TXT(LT) Support [Disabled]
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.

USB Configuration

USB Configuration Parameters


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
USB Configuration
USB Devices:
1 Keyboard, 2 Hubs
Legacy USB Support [Enabled]
EHCI Hand-off [Disabled]
USB hardware delays and time-outs:
USB transfer time-out [20 sec]
Device reset time-out [20 sec]
Device power-up delay [Manual]
Device power-up delay in seconds 5
This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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Legacy USB Support

Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
Choices: Enabled, Disabled, Auto.

EHCI Hand-Off

This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.
Choices: Disabled, Enabled.

USB transfer time-out

The Time-out value for Control, Bulk, and Interrupt transfers.
Choices: 1 sec, 5 sec, 10 sec, 20 sec.

Device Reset time-out

USB mass storage device Start Unit command time-out.
Choices: 10 sec, 20 sec, 30 sec, 40 sec.

Device Power-up delay

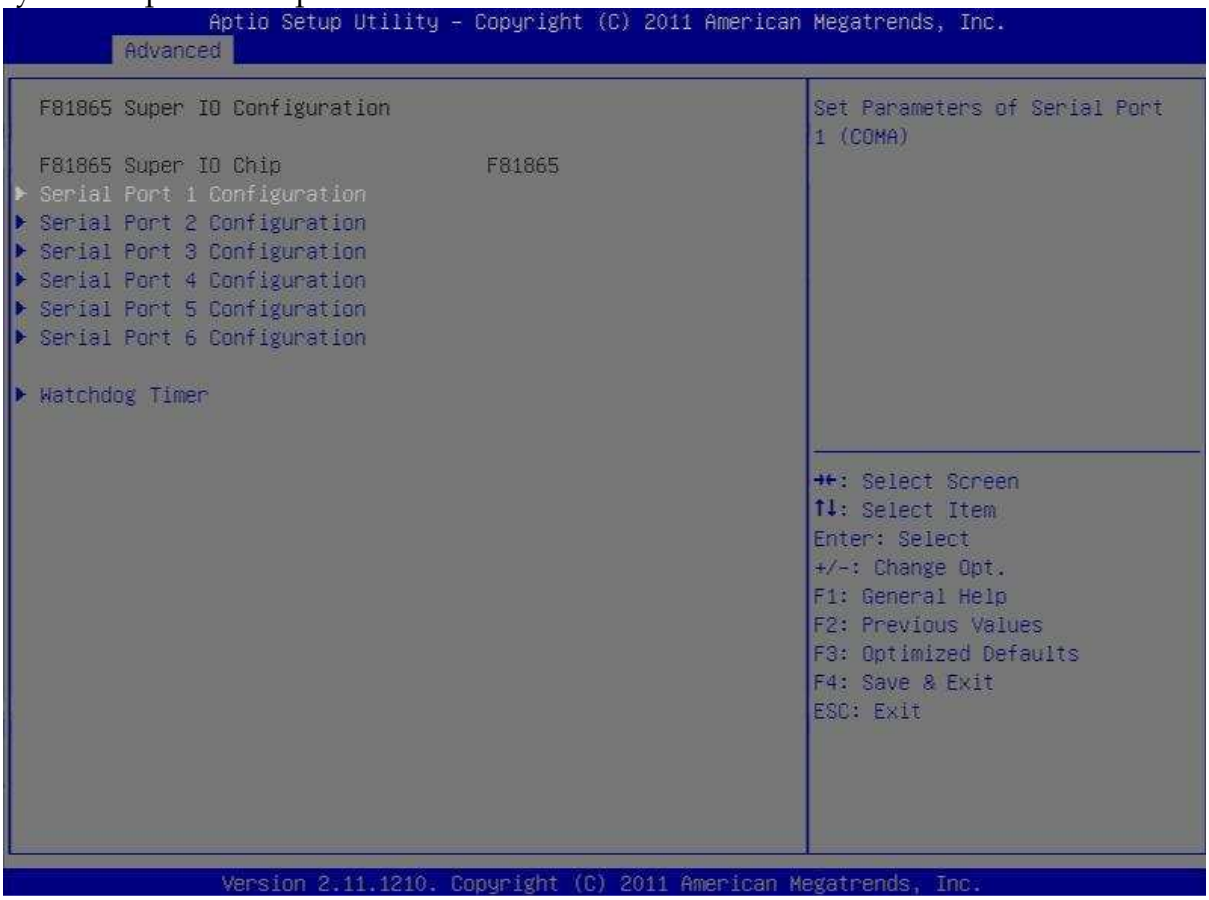
Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.
Choices: Auto, Manual.

Device Power-up delay in seconds

Delay range is 1..40 seconds, in one second increments.
Choices: 1-40.

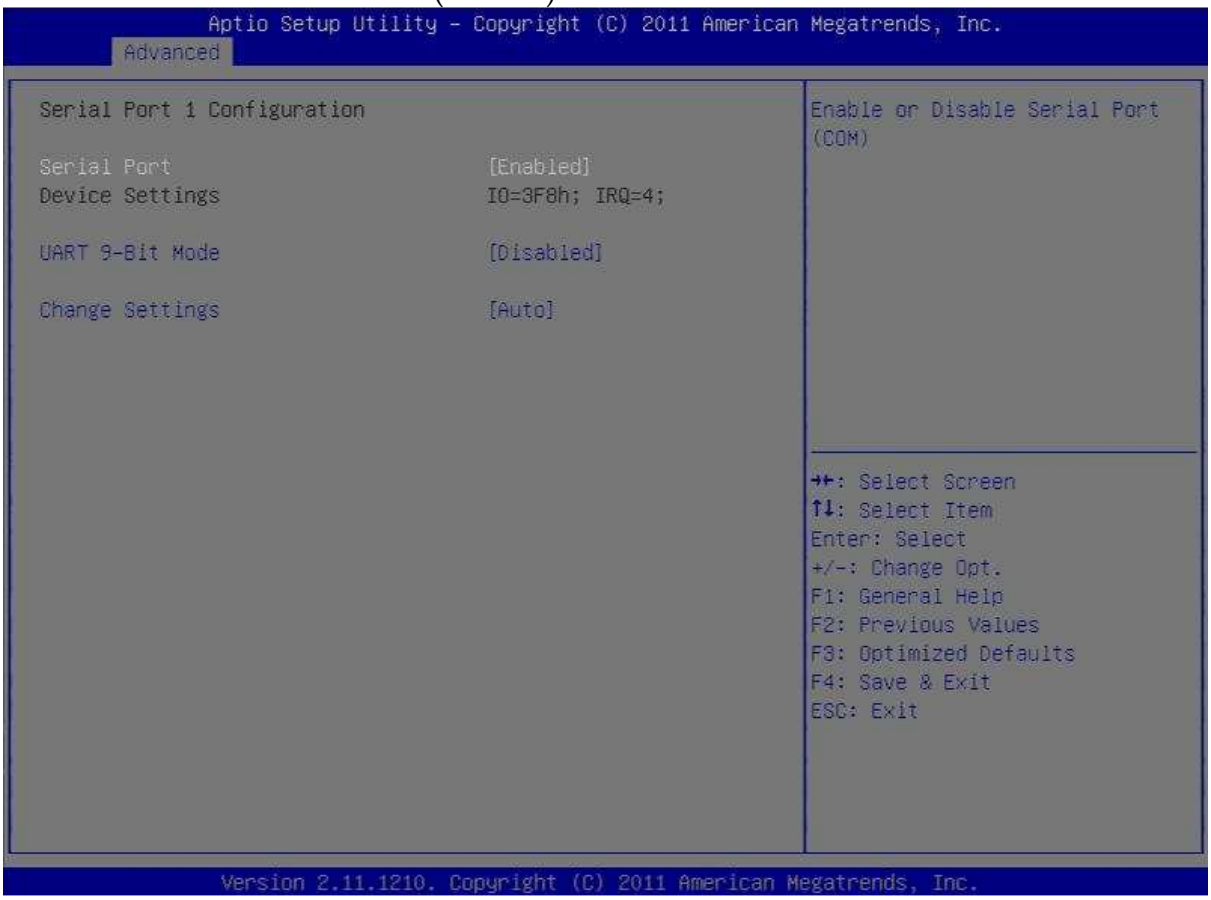
F81865 Super IO Configuration

System Super IO Chip Parameters


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
F81865 Super IO Configuration
F81865 Super IO Chip F81865
Serial Port 1 Configuration
Serial Port 2 Configuration
Serial Port 3 Configuration
Serial Port 4 Configuration
Serial Port 5 Configuration
Serial Port 6 Configuration
Watchdog Timer
Set Parameters of Serial Port 1 (COMA)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.

Serial Port 1 Configuration

Set Parameters of Serial Port 1 (COMA)



Serial Port

Enable or Disable Serial Port (COM)
Choices: Disabled, Enabled.

UART 9-Bit Mode

Control UART-9-Bit Mode Enabled/Disabled.
Choices: Disabled, Enabled.

Change Settings

Select an optimal setting for Super IO Device.
Choices: Auto.
IO=3F8h; IRQ=4;
IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

Serial Port 2 Configuration

Set Parameters of Serial Port 2 (COMB)

Serial Port

Enable or Disable Serial Port (COM)
Choices: Disabled, Enabled.

UART 9-Bit Mode

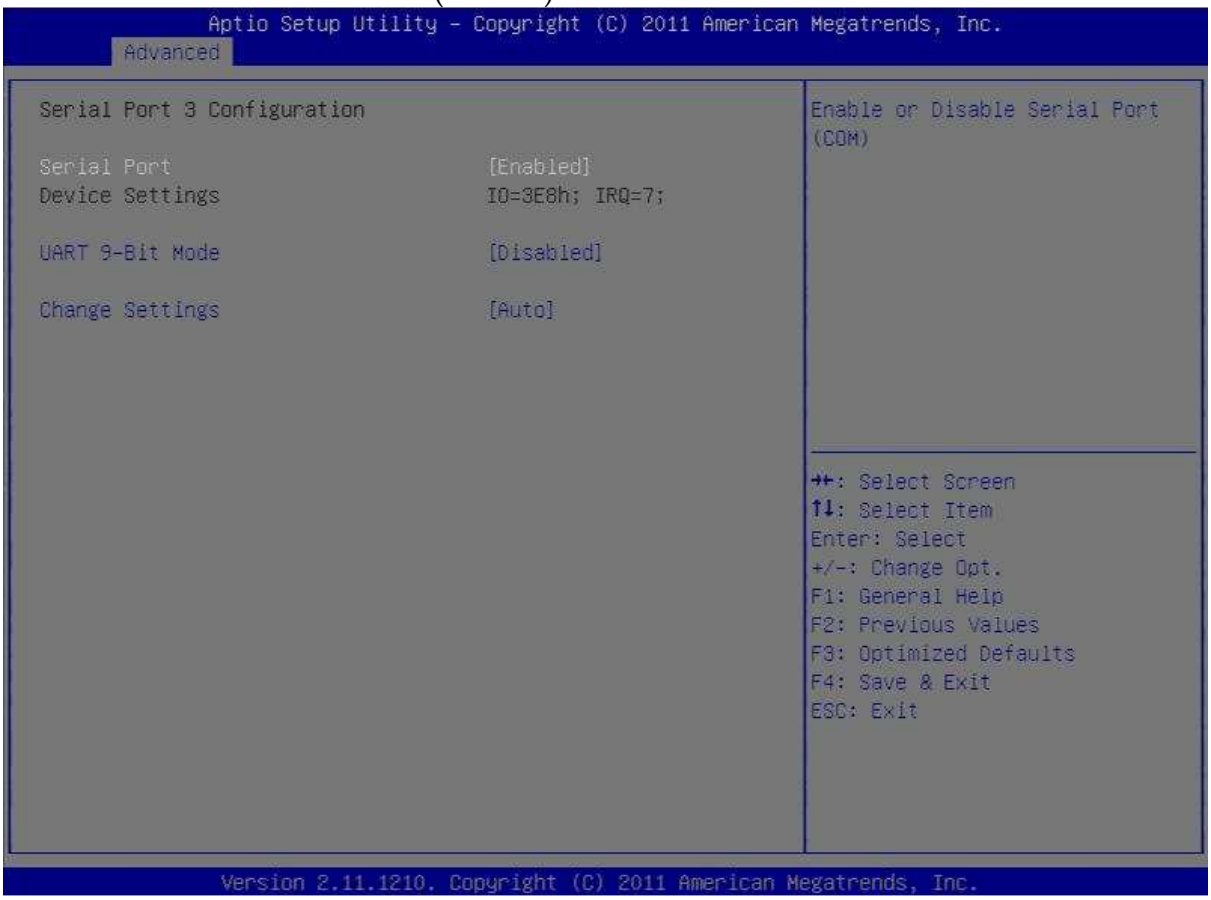
Control UART-9-Bit Mode Enabled/Disabled.
Choices: Disabled, Enabled.

Change Settings

Select an optimal setting for Super IO Device.
Choices: Auto.
IO=2F8h; IRQ=3;
IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

Serial Port 3 Configuration

Set Parameters of Serial Port 3 (COMC)



Serial Port

Enable or Disable Serial Port (COM)
Choices: Disabled, Enabled.

UART 9-Bit Mode

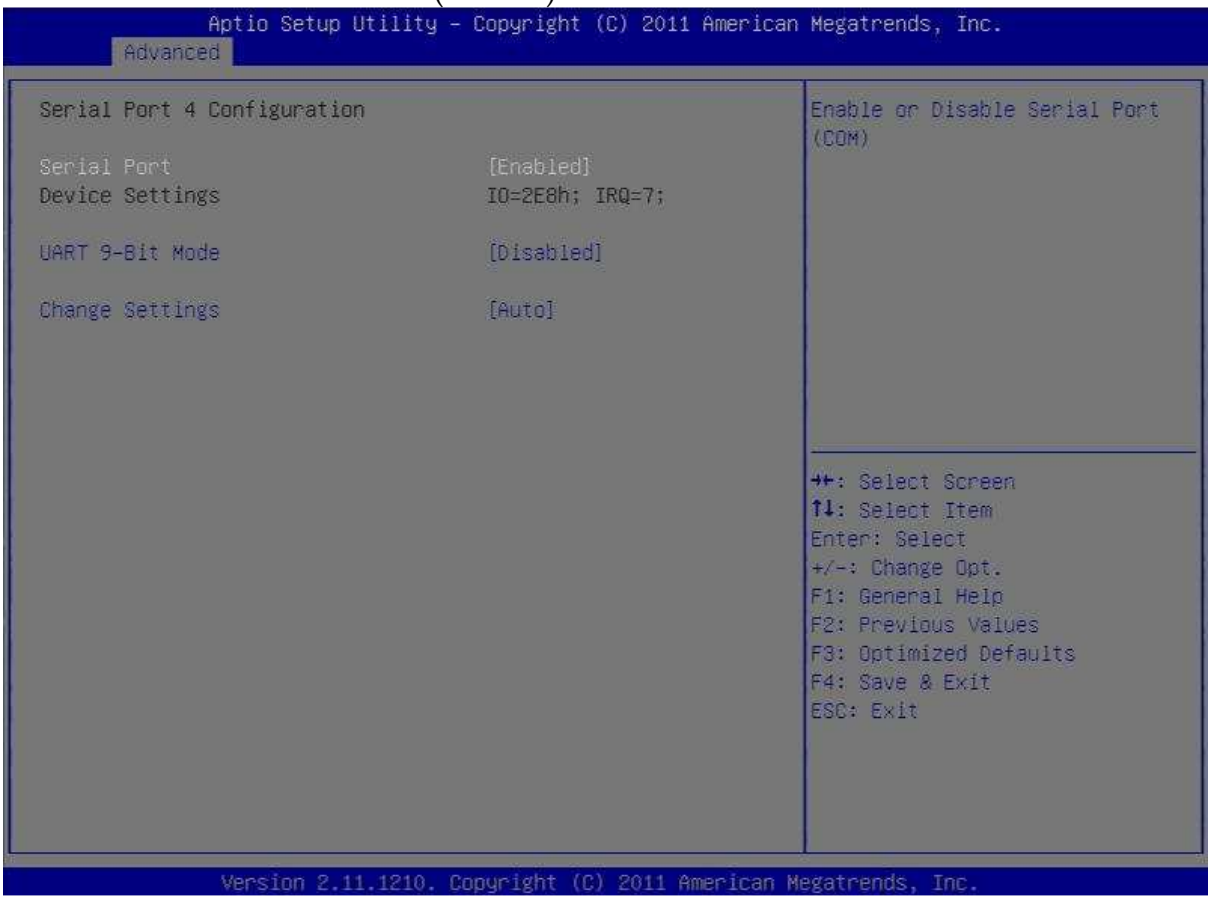
Control UART-9-Bit Mode Enabled/Disabled.
Choices: Disabled, Enabled.

Change Settings

Select an optimal setting for Super IO Device.
Choices: Auto.
IO=3E8h; IRQ=7;
IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2F0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2E0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

Serial Port 4 Configuration

Set Parameters of Serial Port 4 (COMD)



Serial Port

Enable or Disable Serial Port (COM)
Choices: Disabled, Enabled.

UART 9-Bit Mode

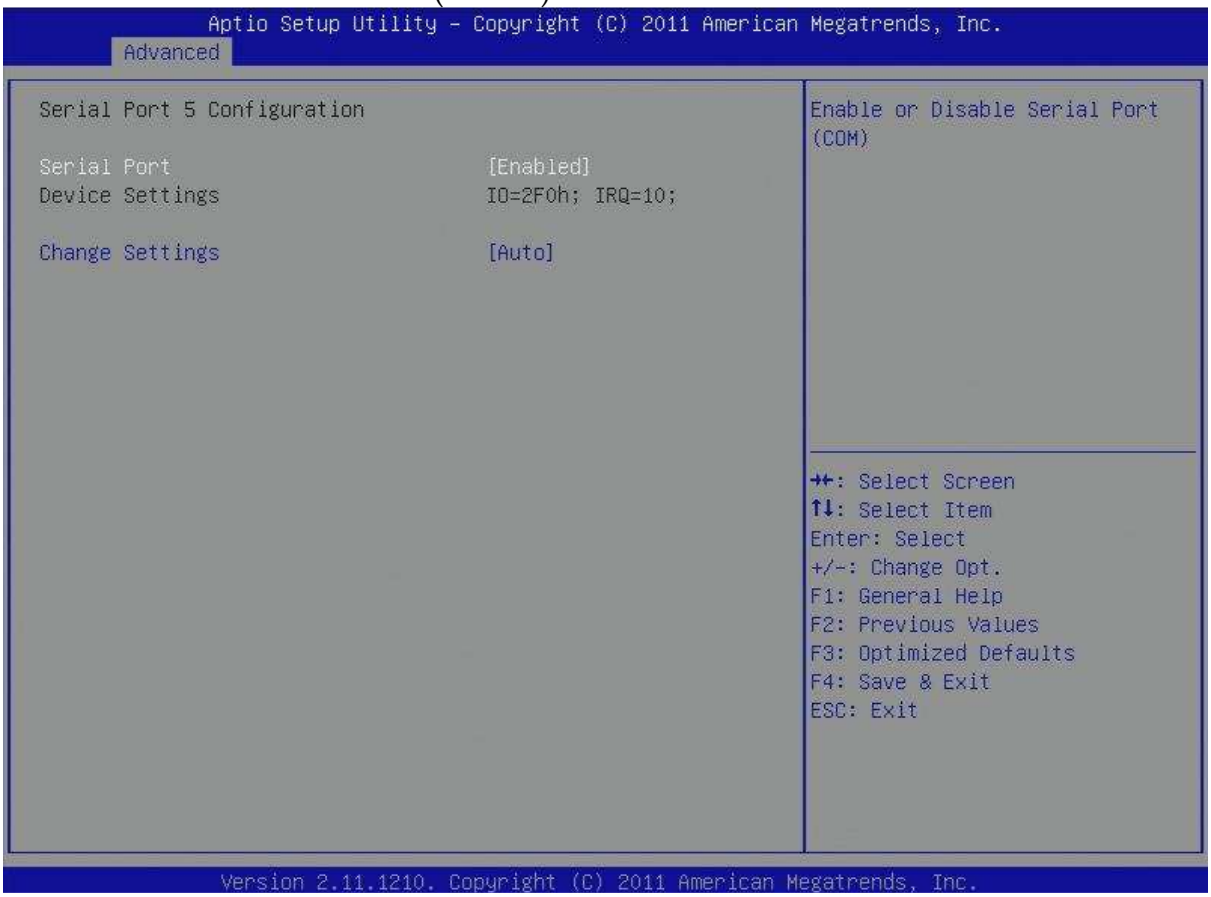
Control UART-9-Bit Mode Enabled/Disabled.
Choices: Disabled, Enabled.

Change Settings

Select an optimal setting for Super IO Device.
Choices: Auto.
IO=2E8h; IRQ=7;
IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2F0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2E0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

Serial Port 5 Configuration

Set Parameters of Serial Port 5 (COME)



Serial Port

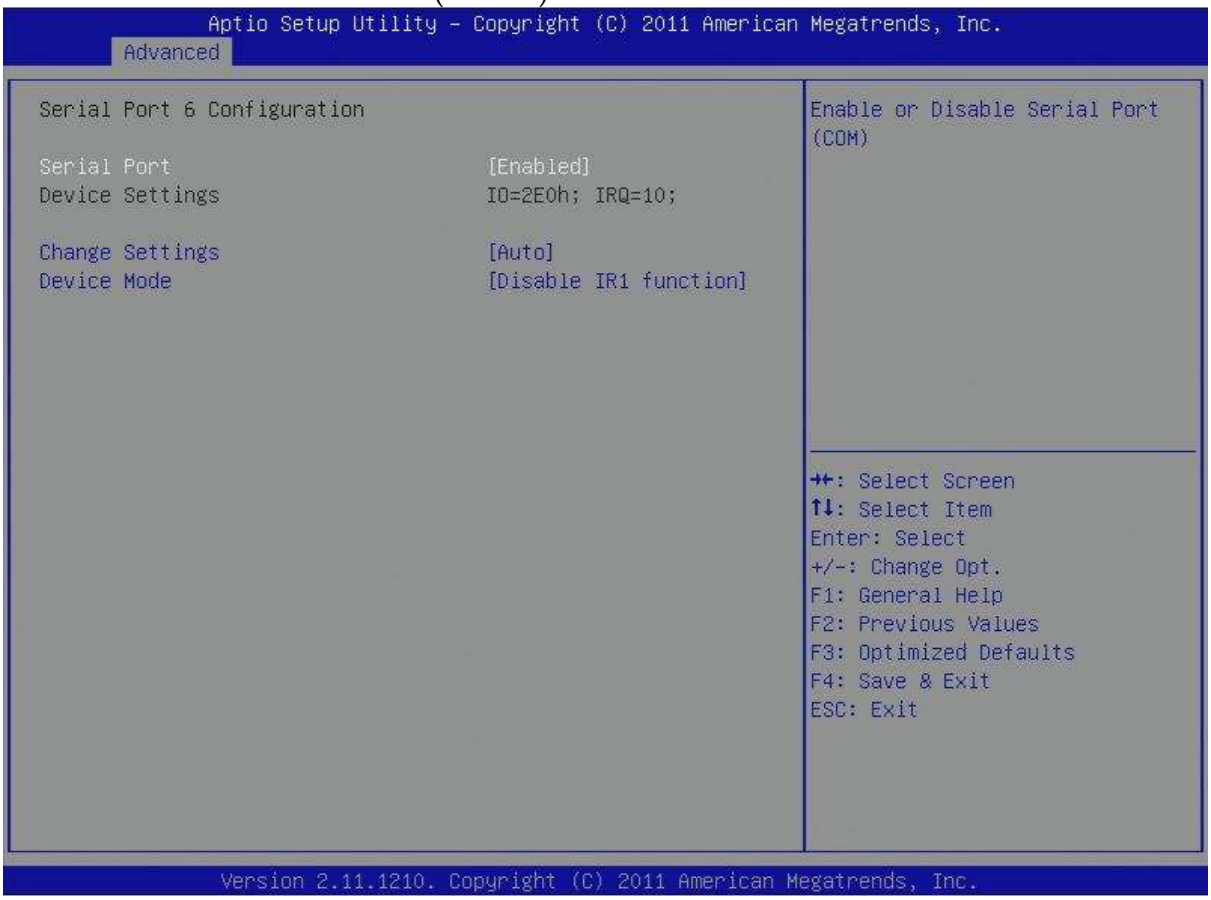
Enable or Disable Serial Port (COM)
Choices: Disabled, Enabled.

Change Settings

Select an optimal setting for Super IO Device.
Choices: Auto.
IO=2F0h; IRQ=10;
IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2F0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2E0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

Serial Port 6 Configuration

Set Parameters of Serial Port 6 (COMF)



Serial Port

Enable or Disable Serial Port (COM)
Choices: Disabled, Enabled.

Change Settings

Select an optimal setting for Super IO Device.
Choices: Auto.
IO=2E0h; IRQ=10;
IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2F0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;
IO=2E0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

Device Mode

Change the Serial Port Mode Enable/Disable IR function.
Choices: Disable IR1 function, Enable IR1 function, active pulse 1.6uS, Enable IR1 function, active pulse 3/16 bit time.

Watchdog Timer

Set watchdog timer value, the value can't interrupt by Keyboard

WDT Controller

Enable WDT Controller

Choices: Disabled, Enabled.

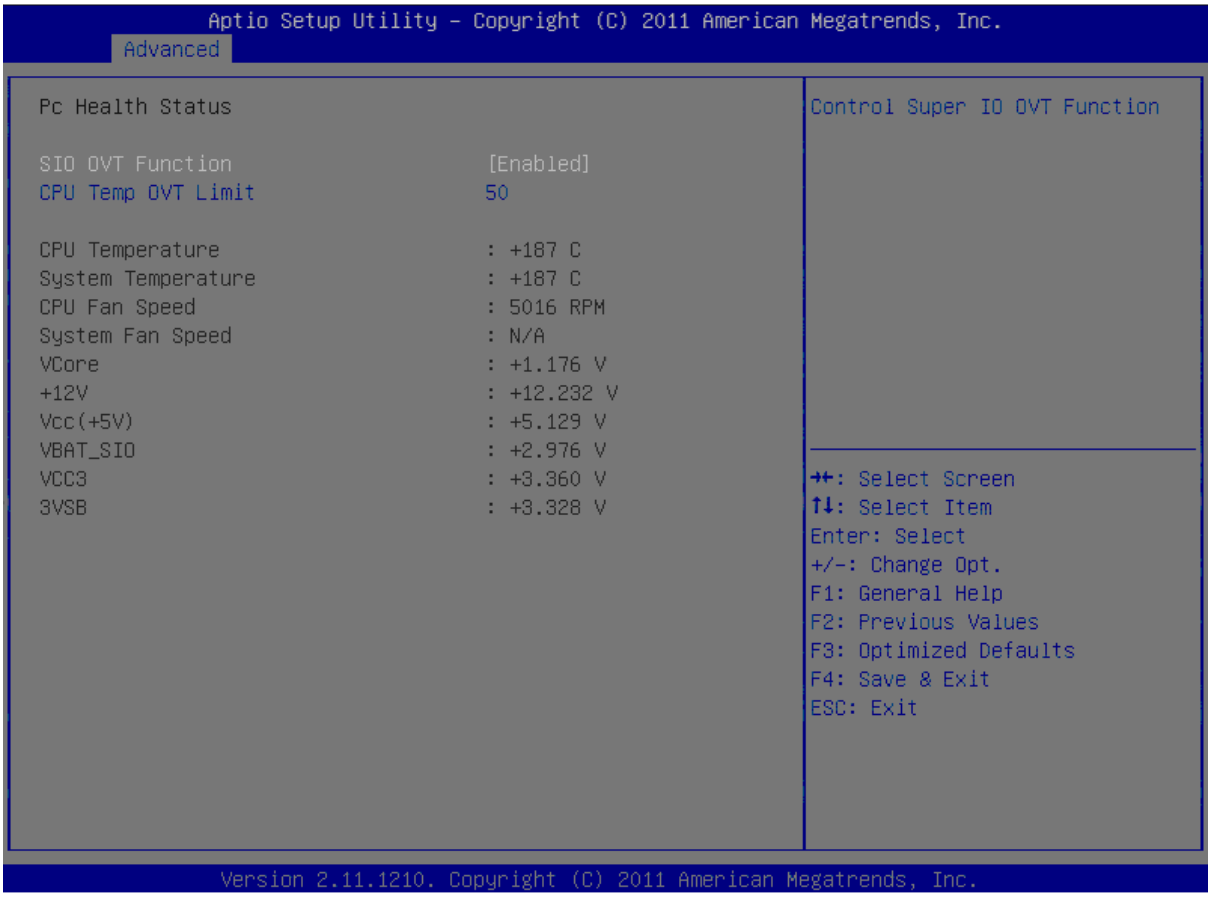
Change Settings

Select an optimal setting for Super IO device.

Choices: WDT Disabled, 10 Seconds, 20 Seconds, 30 Seconds, 40 Seconds, 50 Seconds, 60 Seconds.

F81865 H/W Monitor

Monitor hardware status


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
Pc Health Status
SIO OVT Function [Enabled]
CPU Temp OVT Limit 50
CPU Temperature : +187 C
System Temperature : +187 C
CPU Fan Speed : 5016 RPM
System Fan Speed : N/A
VCore : +1.176 V
+12V : +12.232 V
Vcc(+5V) : +5.129 V
VBAT_SIO : +2.976 V
VCC3 : +3.360 V
3VSB : +3.328 V
Control Super IO OVT Function
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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SIO OVT Function

Control Super IO OVT Function
Choices: Disabled, Enabled.

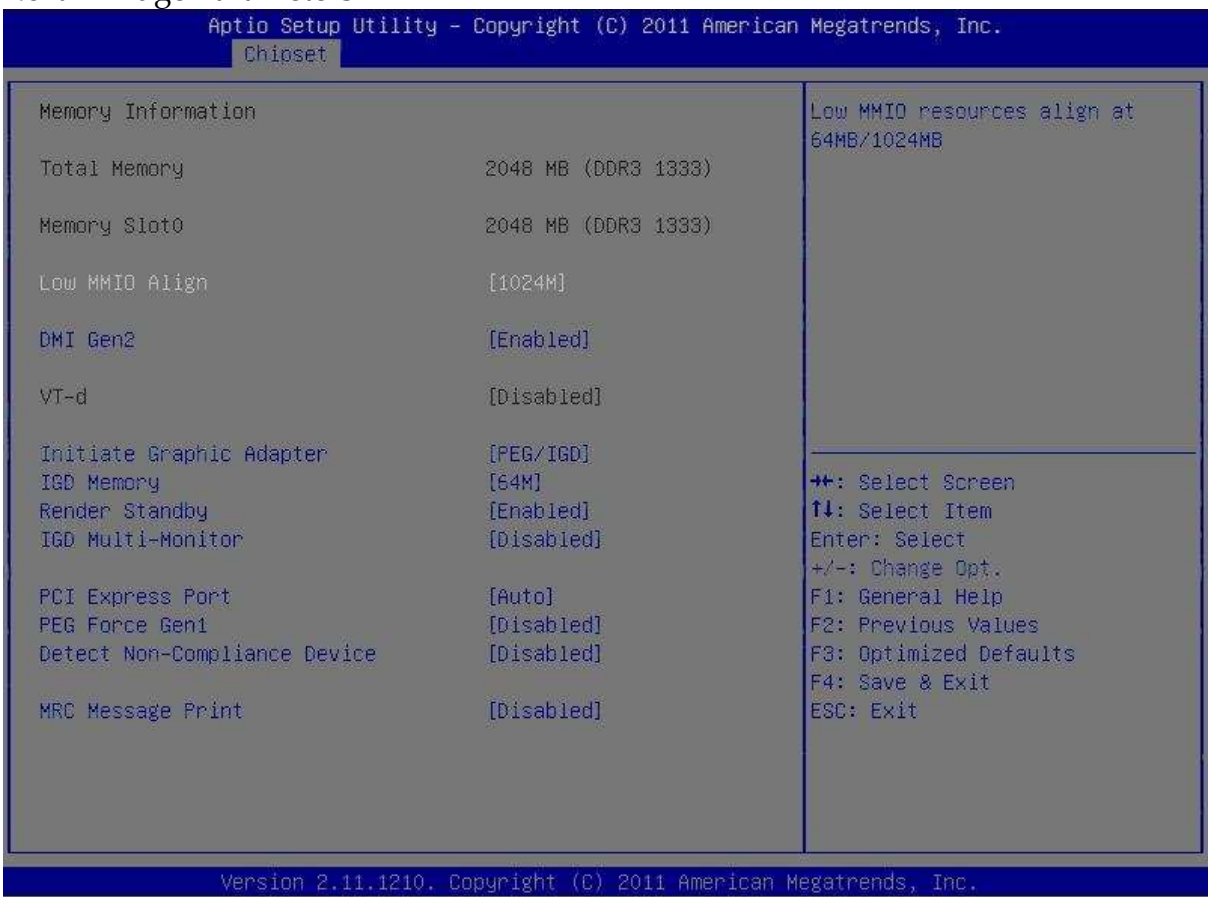
CPU Temp OVT Limit

Adjust OVT temperature Limit value for CPU Temp, Min=30, Max=100
Choices: 30-100.

4.4 Chipset

North Bridge

North Bridge Parameters



Low MMIO Align
Low MMIO resources align at 64MB/1024MB.
Choices: 64M, 1024M.

DMI Gen2
DMI Gen2 Enabled/Disabled.
Choices: Disabled, Enabled.

Initiate Graphic Adapter
Select which graphics controller to use as the primary boot device.
Choices: IGD, PEG/IGD.

IGD Memory
IGD Share Memory Size.
Choices: Disable, 32M, 64M, 96M, 128M, 160M, 192M, 224M, 256M, 288M, 320M, 352M, 384M, 416M,448M, 480M, 512M.

Render Standby
Enable/Disable Render Standby by Internal Graphics Device.
Choices: Disabled, Enabled.

IGD Multi-Monitor
Enable/Disable IGD Multi-Monitor by Internal Graphics Device.
Choices: Disabled, Enabled.

PCI Express Port
PCI Express.
Choices: Disabled, Enabled, Auto.

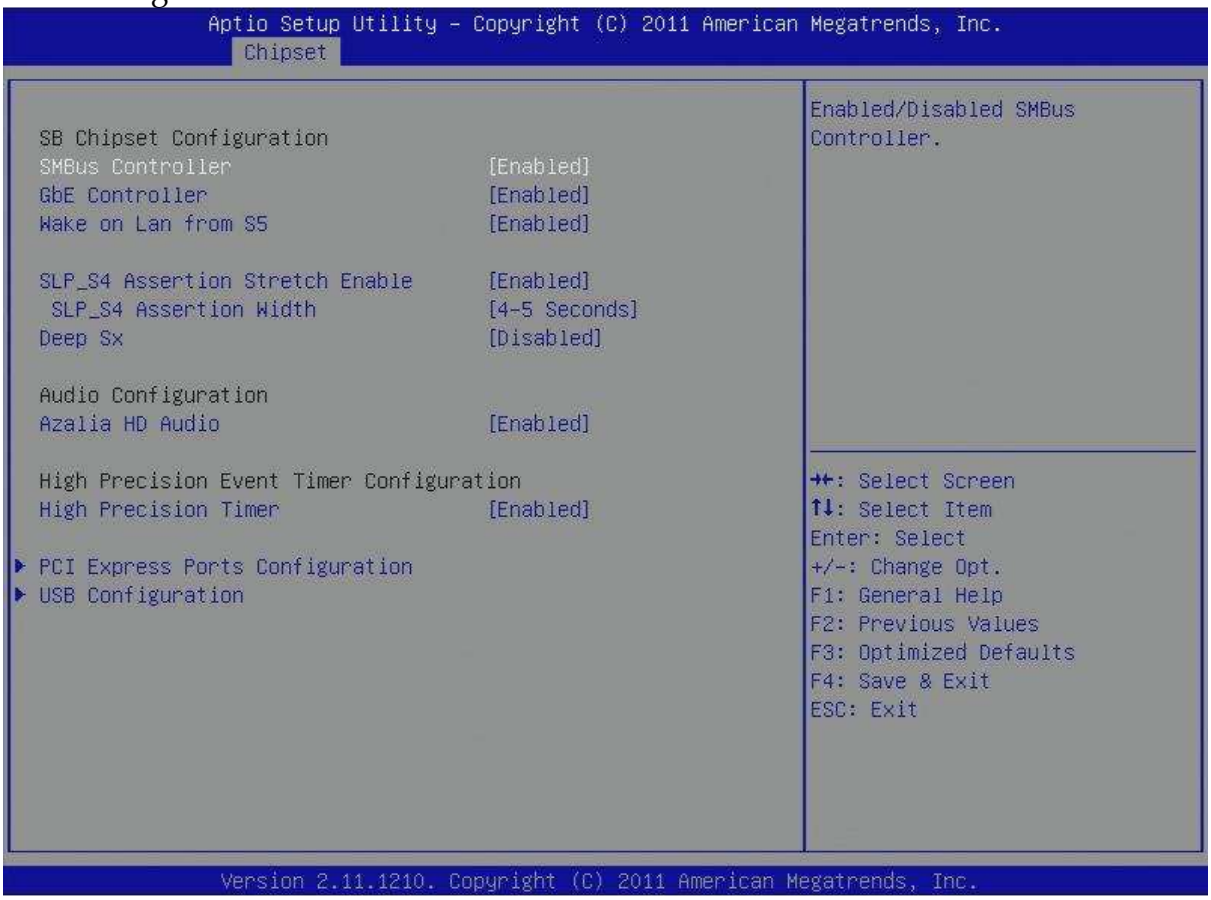
PEG Force Gen1
PCI Express Port Force Gen1.
Choices: Disabled, Enabled.

Detect Non-Compliance Device
Detect Non-Compliance PCI Express Device in PEG.
Choices: Disabled, Enabled.

MRC Message Print
Print Memory initialize message.
Choices: Disabled, Enabled.

South Bridge

South Bridge Parameters



SMBus Controller

Enabled/Disabled SMBus Controller.
Choices: Disabled, Enabled.

GbE Controller

Enabled/Disabled GbE Controller.
Choices: Disabled, Enabled.

Wake on Lan from S5

Enabled/Disabled GbE control PME in S5.
Choices: Disabled, Enabled.

SLP_S4 Assertion Stretch Enable

Enabled/Disabled SLP_S4# Assertion Stretch.
Choices: Disabled, Enabled.

SLP_S4 Assertion Stretch Width

Select a minimum assertion width of the SLP_S4# Assertion signal.
Choices: 1-2 Seconds, 2-3 Seconds, 3-4 Seconds, 4-5 Seconds.

Deep Sx

Deep Sx configuration. Note: Mobile platforms support Deep S4/S5 in DC only and Desktop platforms support Deep S4/S5 in AC only.
Choices: Disabled, Enabled in S5 (Battery), Enabled in S5, Enabled in S4 and S5 (Battery), Enabled in S4 and S5.

Azalia HD Audio

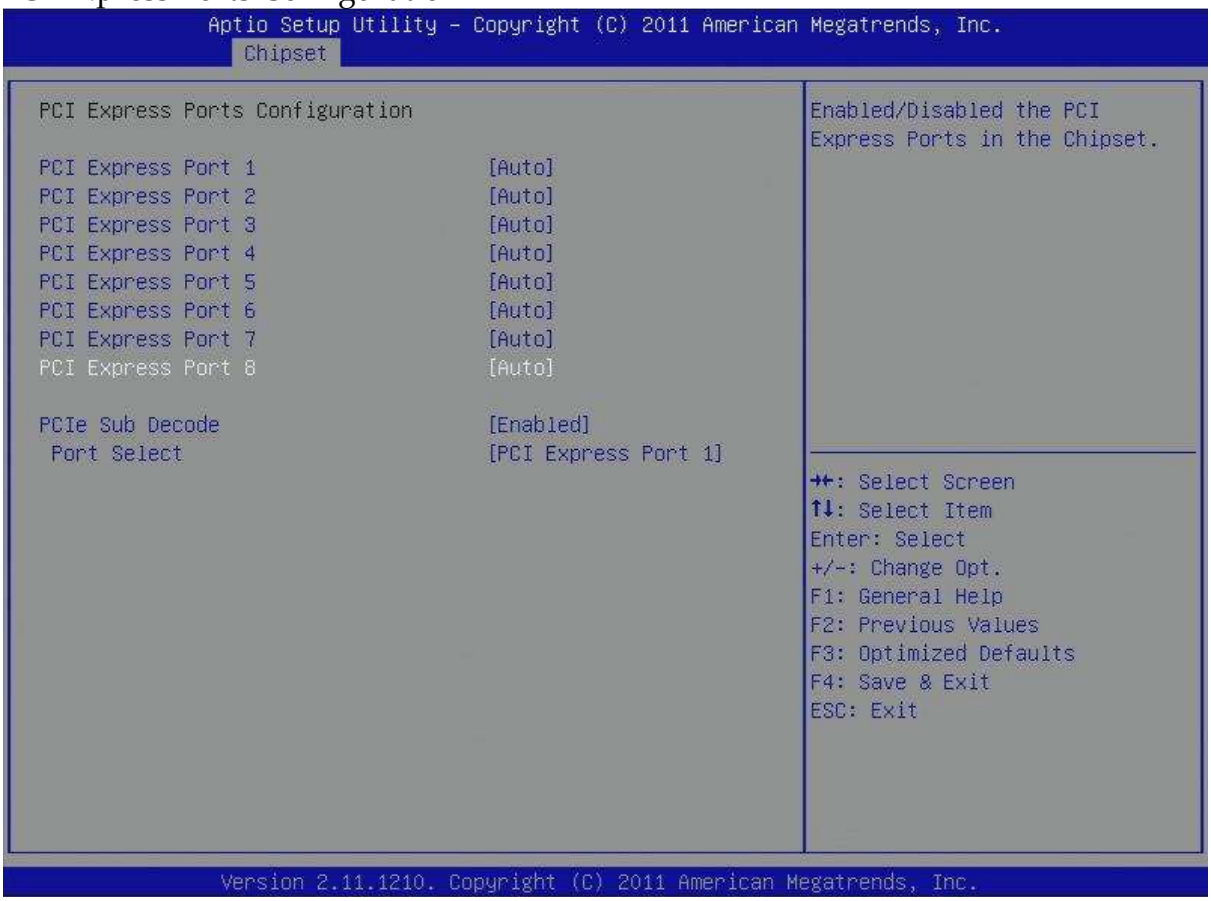
Enabled/Disabled Azalia HD Audio.
Choices: Disabled, Enabled.

High Precision Timer

Enabled/Disabled the High Precision Event Timer.
Choices: Disabled, Enabled.

PCI Express Ports Configuration

PCI Express Ports Configuration


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Chipset
PCI Express Ports Configuration
PCI Express Port 1 [Auto]
PCI Express Port 2 [Auto]
PCI Express Port 3 [Auto]
PCI Express Port 4 [Auto]
PCI Express Port 5 [Auto]
PCI Express Port 6 [Auto]
PCI Express Port 7 [Auto]
PCI Express Port 8 [Auto]
PCIe Sub Decode [Enabled]
Port Select [PCI Express Port 1]
Enabled/Disabled the PCI Express Ports in the Chipset.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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PCI Express Port 1-8

Enabled/Disabled the PCI Express Ports in the Chipset.
Choices: Disabled, Enabled, Auto.

PCIe Sub Decode
Enabled/Disabled PCIe Sub Decode Port. (This option is available when Subtractive Decode Agent Enable. (PCHTrap9 [14] = '1b')
Choices: Disabled, Enabled.

Port Select
PCIe Sub Decode Port Select.
Choices: PCI Express Port1, PCI Express Port2, PCI Express Port3, PCI Express Port4, PCI Express Port5, PCI Express Port6, PCI Express Port7, PCI Express Port8.

USB Configuration
USB Configuration

All USB Devices
Enabled/Disabled All USB Devices.
Choices: Disabled, Enabled.

EHCI Controller 1/2
Enabled/Disabled USB2.0 (EHCI) Support.
Choices: Disabled, Enabled.

USB Port 0-7
Enabled/Disabled USB Port 0-7.
Choices: Disabled, Enabled.

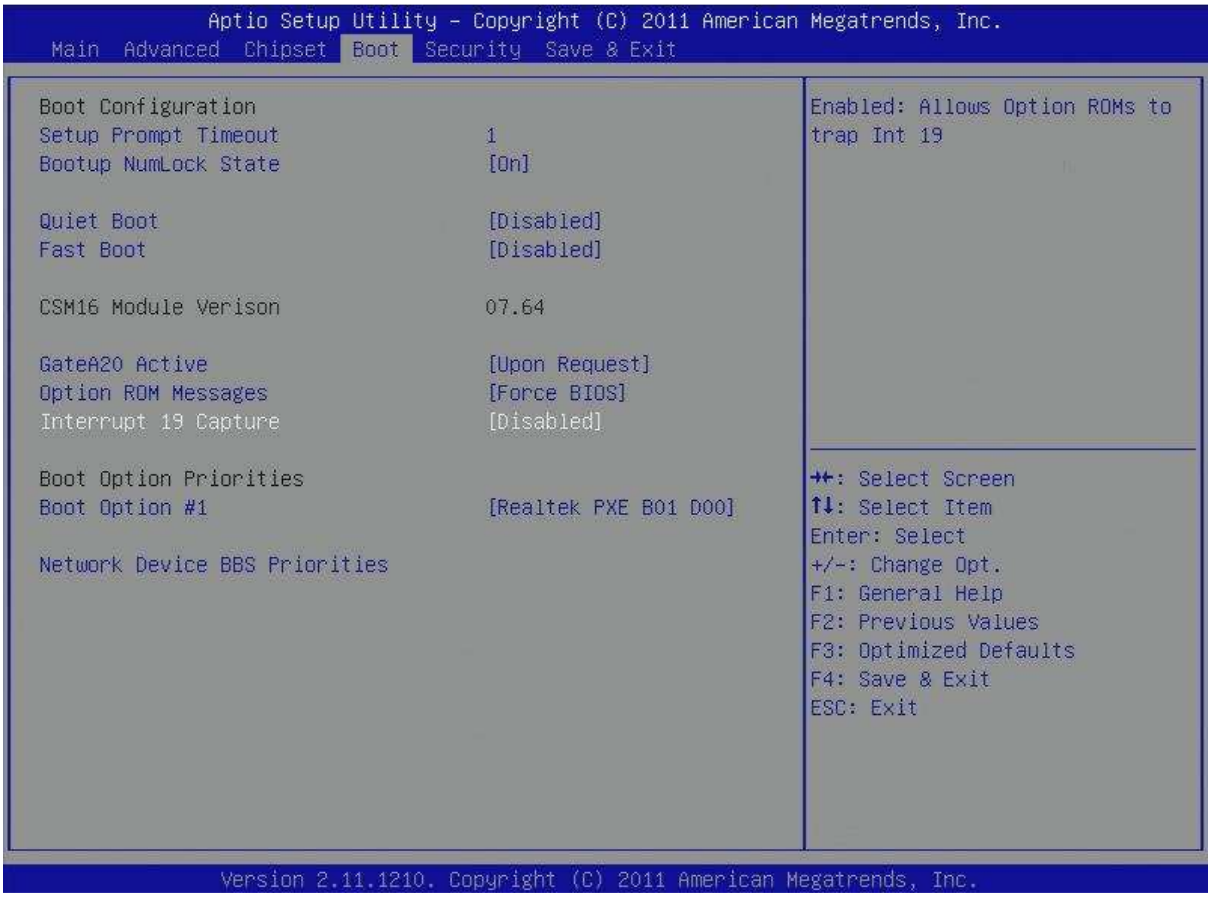
Chipset Reference Board

CRB board Parameters

CIRA Trigger

CIRA Trigger Enable/Disable.
Choices: Disabled, Enabled.

4.5 Boot


Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Boot Configuration
Setup Prompt Timeout 1
Bootup NumLock State [On]
Quiet Boot [Disabled]
Fast Boot [Disabled]
CSM16 Module Verison 07.64
GateA20 Active [Upon Request]
Option ROM Messages [Force BIOS]
Interrupt 19 Capture [Disabled]
Boot Option Priorities
Boot Option #1 [Realtek PXE B01 D00]
Network Device BBS Priorities
Enabled: Allows Option ROMs to trap Int 19
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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Setup Prompt Timeout

Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Choices: 1-65535.

Bootup Num-Lock State

Select the keyboard Numlock state.
Setting to [On] will turn on the Num Lock key when the system is powered on. Setting to [Off] will allow users to use the arrow keys on the numeric keypad.
Choices: On, Off.

Quiet Boot

Enables or disables Quiet Boot option.
This BIOS feature determines if the BIOS should hide the normal POST messages with the motherboard or system manufacturer's full-screen logo. When it is enabled, the BIOS will display the full-screen logo during the boot-up sequence, hiding normal POST messages.
When it is disabled, the BIOS will display the normal POST messages, instead of the full-screen logo.

Please note that enabling this BIOS feature often adds 2-3 seconds of delay to the booting sequence. This delay ensures that the logo is displayed for a sufficient amount of time. Therefore, it is recommended that you disabled this BIOS feature for a faster boot-up time.
Choices: Disabled, Enabled.

Fast Boot
Enables or Disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.
Choices: Disabled, Enabled.

GateA20 Active
UPON REQUEST – GA20 can be disabled using BIOS services. ALWAYS – do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.
Choices: Upon Request, Always.

Option ROM Messages
Set Display mode for Option ROM.
This item is used to determine the display mode when an optional ROM is initialized during POST. When set to [Force BIOS], the display mode used by AMI BIOS is used. Select [Keep Current] if you want to use the display mode of optional ROM.
Choices: Force BIOS, Keep Current.

Interrupt 19 Capture
Enabled: Allows Option ROMs to trap Int 19.
Interrupt 19 is the software interrupt that handles the boot disk function. When Enabled, this BIOS feature allows the ROM BIOS of these host adaptors to "capture" Interrupt 19 during the boot process so that drives attached to these adaptors can function as bootable disks. In addition, it allows you to gain access to the host adaptor's ROM setup utility, if one is available.

When Disabled, the ROM BIOS of these host adaptors will not be able to "capture" Interrupt 19. Therefore, you will not be able to boot operating systems from any bootable disks attached to these host adaptors. Nor will you be able to gain access to their ROM setup utilities.
Choices: Disabled, Enabled.

Boot Option #1
Sets the system boot order.
Choices: Realtek PXE B01 D00, other bootable devices, Disabled.

Network Device BBS Priorities

Set the order of the legacy devices in this group.

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Boot
Boot Option #1 [Realtek PXE B01 D00]
Boot Option #2 [Realtek PXE B02 D00]
Sets the system boot order
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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Boot Option #1

Sets the system boot order.

Choices: Realtek PXE B01 D00, Realtek PXE B02 D00, Disabled.

Boot Option #2

Sets the system boot order.

Choices: Realtek PXE B01 D00, Realtek PXE B02 D00, Disabled.

4.6 Security

Use this menu to set supervisor and user passwords

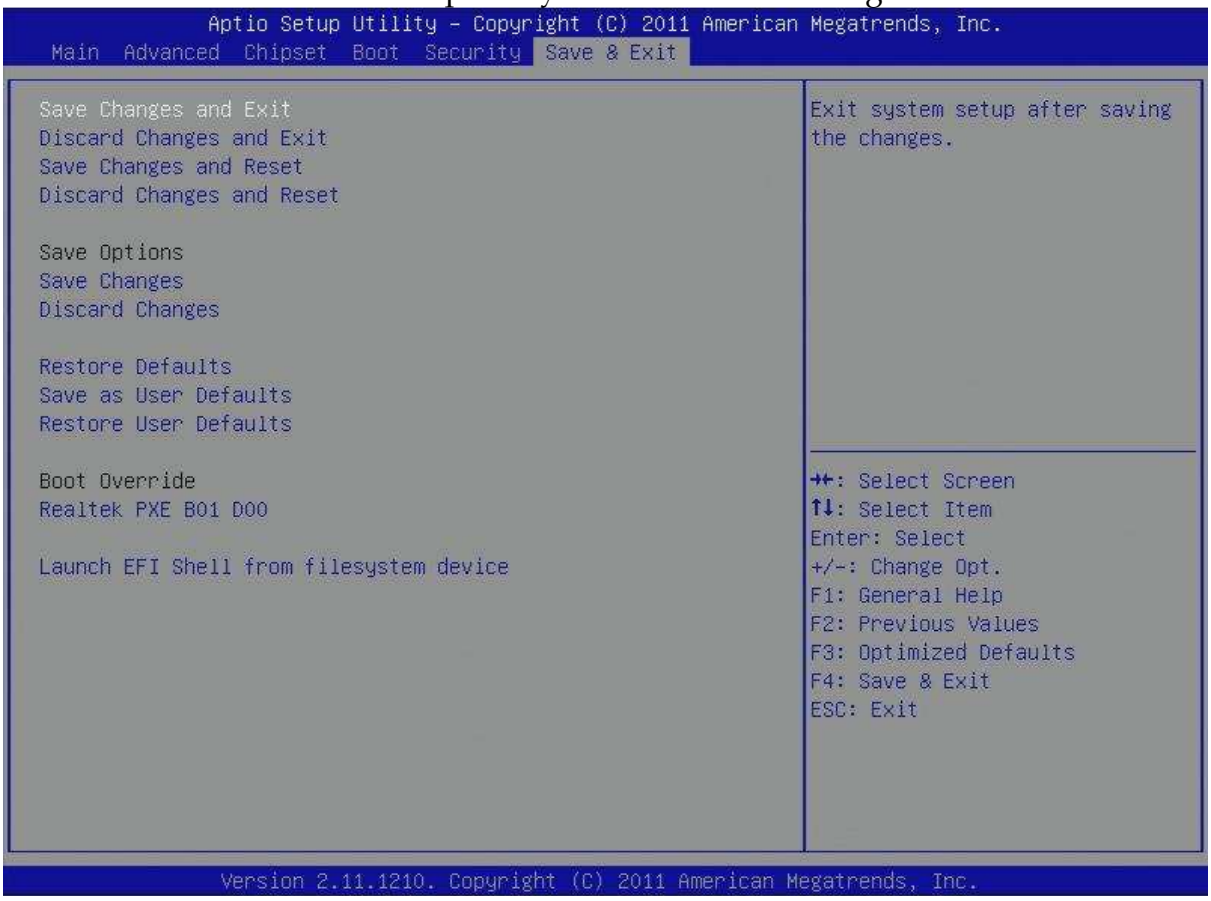
Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password must be 3 to 20 characters long.
Administrator Password
User Password
Set Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.11.1210. Copyright (C) 2011 American Megatrends, Inc.

Administrator Password
Set Setup Administrator Password.

User Password
Set User Password.

4.7 Save & Exit

This menu allows you to load the BIOS default values or factory default settings into the BIOS and exit the BIOS setup utility with or without changes



Save Changes and Exit
Exit system setup after saving the changes.
Pressing <Enter> on this item asks for confirmation: Save configuration and exit.

Discard Changes and Exit
Exit system setup without saving any changes.
Pressing <Enter> on this item asks for confirmation: Quit without saving.

Save Changes and Reset
Reset system setup after saving the changes.
Pressing <Enter> on this item asks for confirmation: Save configuration and reset.

Discard Changes and Reset
Reset system setup without saving any changes.
Pressing <Enter> on this item asks for confirmation: Reset without saving.

Save Changes
Save Changes done so far to any of the setup options.
Pressing <Enter> on this item asks for confirmation: Save configuration.

Discard Changes
Discard Changes done so far to any of the setup options.
Pressing <Enter> on this item asks for confirmation: Load Previous Values.

Restore Defaults
Restore/Load Default values for all the setup options.
Pressing <Enter> on this item asks for confirmation: Load Optimized Defaults.

Save as User Defaults
Save the changes done so far as User Defaults.
Pressing <Enter> on this item asks for confirmation: Save configuration.

Restore User Defaults
Restore the User Defaults to all the setup options.
Pressing <Enter> on this item asks for confirmation: Restore User Defaults.

Launch EFI Shell from filesystem device
To enter the Built-in EFI shell for further modification such as upgrade BIOS.
It can debug and dump the PCI Resource or jump to next bootable device. If it doesn't have boot device, it will return to BIOS setup menu. If you want to know the shell command, you can visit the Intel official hyperlink as below.

http://software.intel.com/en-us/articles/uefi-shell/#Internal_EFI_Shell_Commands

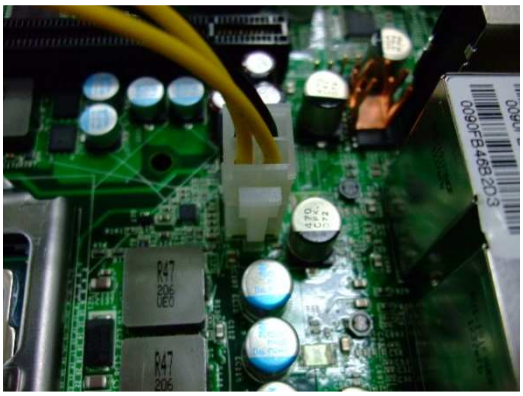
Chapter 5
Troubleshooting

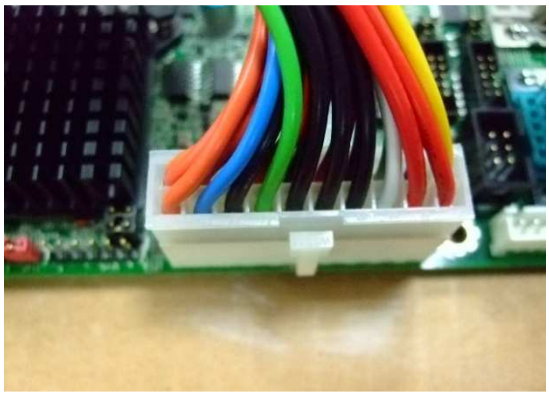
This chapter provides a few useful tips to quickly get PGB-5120S running with success. As basic hardware installation has been addressed in Chapter 2, this chapter will primarily focus on system integration issues, in terms of BIOS setting, and OS diagnostics.

5.1 Hardware Quick Installation

ATX Power Setting

Unlike other Single board computer, PGB-5120S supports ATX emulation AT Mode. However, there are only two connectors that must be connected—J13 (4 pins CPU +12V main power connector) & J14 20 pins ATX Power Connector.





Serial ATA Hard Disk Setting for IDE/AHCI

Unlike IDE bus, each Serial ATA channel can only connect to one SATA hard disk at a time; there are total four connectors, J19 & J20 two ports on-board support 3Gb, because SATA hard disk doesn't require setting up Master and Slave, which can reduce mistake of hardware installation. Those two SATA ports also can support SATA DOM when change the JP23 & JP24 jumper settings. All you need to operate IDE and AHCI application for system please follow up setting guide in BIOS programming (Table 5-1); Furthermore, you can consult chapter 4.3
Advanced "SATA Configuration" part of the" SATA Mode".

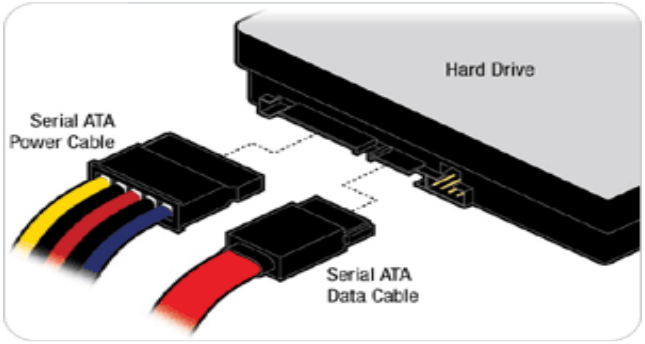
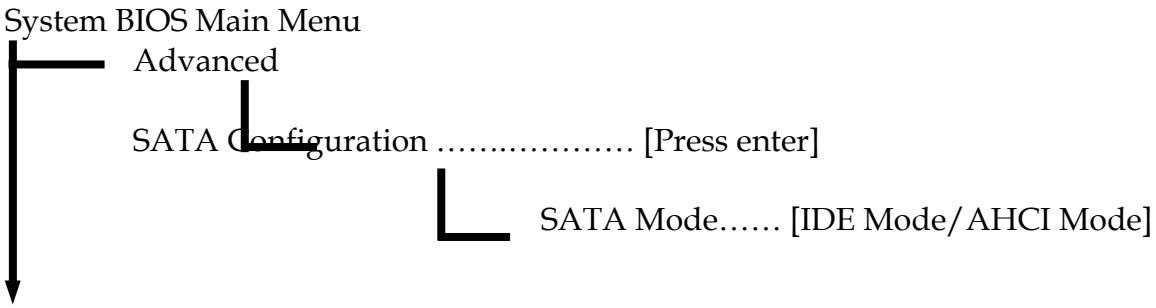


Table. 5-1 SATA Mode setting guide



5.2 BIOS Setting

It is assumed that users have correctly adopted modules and connected all the devices cables required before turning on ATX power. 204-pin DDR3 Memory, keyboard, mouse, SATA hard disk, VGA connector, device power cables, ATX accessories are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.

To make sure that you have a successful start with PGB-5120S, it is recommended, when going with the boot-up sequence, to hit "DEL" or "F2"key and enter the BIOS setup menu to tune up a stable BIOS configuration so that you can wake up your system far well.

Loading the default optimal setting

When prompted with the main setup menu, please scroll down to **"Restore Defaults**", press **"Enter"** and select "**Yes"** to load in default optimal BIOS setup. This will force your BIOS setting back to the initial factory configuration. It is recommended to do this so you can be sure the system is running with the BIOS setting that Portwell has highly endorsed. As a matter of fact, users can load the default BIOS setting any time when system appears to be unstable in boot up sequence.

Improper Disable Operation

There are too many occasions where users disable a certain device/feature in one application through BIOS setting. These variables may not be set back to the original values when needed. These devices/features will certainly fail to be detected.

When the above conditions happen, it is strongly recommended to check the BIOS settings. Make sure certain items are set as they should be. These include the Serial Port1/ Serial Port 2 ports, USB ports, external cache, on-board VGA and Ethernet.

It is also very common that users would like to disable a certain device/port to release IRQ resource. A few good examples are

Disable Serial Port1 to release IRQ #4
Disable Serial Port2 to release IRQ #3
Etc…

A quick review of the basic IRQ mapping is given below for your reference.

IRQ#	Description
IRQ #0	System Timer
IRQ #1	Keyboard Event
IRQ #2	Usable IRQ
IRQ #3	COM2
IRQ #4	COM1
IRQ #5	Usable IRQ
IRQ #6	Diskette Event
IRQ #7	Usable IRQ
IRQ #8	Real-Time Clock
IRQ #9	Usable IRQ
IRQ #10	Usable IRQ
IRQ #11	Usable IRQ
IRQ #12	IBM Mouse Event
IRQ #13	Coprocessor Error
IRQ #14	Hard Disk Event
IRQ #15	Usable IRQ

It is then very easy to find out which IRQ resource is ready for additional peripherals. If IRQ resource is not enough, please disable some devices listed above to release further IRQ numbers.

5.3 FAQ

Symptom: SBC keeps beeping, and no screen has shown.

Solution: In fact, each beep sound represents different definition of error message. Please refer to table as following:

Beep sounds	Meaning	Action
One long beep with one short beeps	DRAM error	Change DRAM or reinstall it
One long beep constantly	DRAM error	Change DRAM or reinstall it
One long beep with two short beeps	Monitor or Display Card error	Please check Monitor connector whether it inserts properly
Beep rapidly	Power error warning	Please check Power mode setting

Information & Support

Question: I forget my password of system BIOS, what am I supposed to do?

Answer: You can simply short 2-3 pins on JP17 to clean your password.

JP17: CMOS Clear Header

JP17	Function
Short 1-2	Normal Operation *
Short 2-3	Clear CMOS Contents

Note : The " * " mark for default setting

Question: How to update the BIOS file of the PGB-5120S?

Answer:

1. Please visit web site of the Portwell download center as below hyperlink and register an account. (The E-Mail box should be an existing Company email address that you check regularly.)
   http://www.portwell.com.tw/member/newmember.php
2. Input your User name and password to log in the download center.
3. Select the "Search download" to input the keyword "PGB-5120S".
4. Find the "BIOS "page to download the ROM file and flash utility.
5. Execute the zip file to root of the bootable USB pen drive which can boot to DOS mode.
6. Insert your bootable USB pen drive in PGB-5120S board and power-on.
7. Boot to DOS mode then input the "Update" command to start to update BIOS process.
8. Switch "Off" the Power Supply when you finished the update process.
9. Wait 5 seconds then switch "ON" the Power Supply then press the "Del" or"F2" key to BIOS to select "Restore Setup Defaults" and then select "Exit Saving Changes" option.

Note:

Please visit our technical web site at
http://www.portwell.com.tw
For additional technical information, which is not covered in this manual, you can mail to tsd@mail.portwell.com.tw or you can also send mail to our sales, they will be very delighted to forward them to us.